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Commuting Alternatives in the United States: Recent Trends and a Look to the Future

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Commuting Alternatives in the United States: Recent Trends and a Look to the Future

**Final Report
December 1994**

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This document is designed to provide a comprehensive look at the recent trends in the use of commuting alternatives in the United States, as well as to provide an assessment of the future of each alternative. After reviewing national commuting trends in general, an assessment of commuting alternatives is provided, including public transportation, ridesharing, and working at home. The report draws primarily from the 1990 decennial census (and previous) and the American Housing Surveys conducted in 1985, 1989, and 1991. In addition, some data are used as compiled from the 1990 Nationwide Personal Transportation Study (NPTS), a national survey sponsored by the Federal Highway Administration (FHWA).

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ABSTRACT

Changing demographic and travel behavior characteristics have resulted in significant challenges for transportation decisionmakers, planners, and practitioners throughout the U.S. Efforts to meet these challenges have had varying degrees of success and/or failure and, as we look to the future, it appears that dealing with existing and evolving transportation needs will only become more difficult. Commuting in the U.S. has evolved substantially over the past several decades, from the more traditional commute with a majority of destinations in the central business district to new travel patterns where commuting from suburb to suburb has grown to be the dominant commuting pattern. This report was prepared to assist in developing a thorough understanding of recent trends in commuting alternatives in the U.S. Using data from the Census, American Housing Survey (AHS), and the Nationwide Personal Transportation Study (NPTS), general trends in commuting are presented, including those related to mode choice, vehicle occupancy, departure time, travel time, and travel distance. This is followed by a discussion of commuting alternatives, including public transportation, ridesharing, and working at home. Recent trends in the use of each commuting alternative are presented, including the commute share for a series of commuter subgroups characterized by a variety of geographic, demographic, and housing characteristics. A discussion of the future outlook for each of the commuting alternatives also is presented and includes some basic recommendations regarding what can be done to maintain, and perhaps increase, the commute mode share of each of the commuting alternatives.



EXECUTIVE SUMMARY

Changing demographic and travel behavior characteristics have resulted in significant challenges for transportation decisionmakers, planners, and practitioners throughout the U.S. Efforts to meet these challenges have had varying degrees of success and/or failure and, as we look to the future, it appears that dealing with existing and evolving transportation needs will only become more difficult.

This report was prepared to assist in developing a thorough understanding of recent trends in commuting alternatives in the U.S. Using data from the Decennial Census, the American Housing Survey (AHS), and the Nationwide Personal Transportation Study (NPTS), general trends in commuting are presented, including those related to mode choice, vehicle occupancy, departure time, travel time, and travel distance. This is followed by a discussion of commuting alternatives, including public transportation, ridesharing, and working at home. Recent trends in the use of each commuting alternative are presented, including the commute share for a series of commuter subgroups characterized by a variety of geographic, demographic, and housing characteristics. A discussion of the future outlook for each of the commuting alternatives also is presented and includes some basic recommendations regarding what can be done to maintain, and perhaps increase, the commute mode share of each of the commuting alternatives.

Commuting in the United States has evolved substantially over the past several decades, from the more traditional commute with a majority of destinations in the central business district to new travel patterns where commuting from suburb to suburb has evolved to be the dominant commute flow pattern. Familiarity with the general characteristics and trends in commuting in general is an important element in the development of a thorough understanding of the commuting alternatives discussed in the remainder of the report.

NATIONAL COMMUTING TRENDS

Recent national commuting trends were compiled using data from the NPTS, Census, and AHS. A summary of these results includes the following:

National Travel Summary

- According to the NPTS, U.S. population rose from over 197 million in 1969 to over 239 million in 1990, an increase of 21 percent.
- The number of annual person trips increased 72 percent, from just over 145 billion in 1969 to nearly 250 billion in 1990.
- Similarly, a 65 percent increase was observed for annual person miles of travel, from 1,404 billion in 1969 to 2,315 billion in 1990.
- The number of persons trips per capita increased from 736 in 1969 to 1,042 in 1990, an increase of 42 percent.
- Annual person miles of travel per capita increased 36 percent, from 7,120 miles in 1969 to 9,671 miles in 1990.
- Average person trip length declined by 4 percent, from 9.67 miles in 1969 to 9.45 miles in 1990.
- Nearly 22 percent of all person trips are made as part of earning a living, including commuting to work and other job-related trips.
- Nearly 62 percent of all vehicle trips made in the morning peak (6 a.m. to 9 a.m.) are home-based work trips.

Commute Mode Choice

- The number of workers using the private vehicle as the main means of transportation to work (driving alone and ridesharing) increased from 41.4 million in 1960 to 99.6 million in 1990, an increase of 141 percent. The private vehicle mode share increased from 67 percent to 87 percent over the same time period.
- From 1980 to 1990, the number of workers driving to work alone increased from 62.2 million to 84.2 million, a growth rate of 35 percent. The share of work travel for driving alone increased from 64.4 percent in 1980 to 73.2 percent in 1990.

- All alternatives experienced declines in mode share in each of the past three decades, with the exception of working at home in the 1990s.
- Distinguished as a separate mode starting in 1980, the number of workers carpooling to work decreased from 19.1 million in 1980 to 15.4 million in 1990, a decline of 19 percent. The mode share also declined from 19.7 percent in 1980 to 13.4 percent in 1990.
- The number of workers walking to work decreased from 6.4 million in 1960 to 4.5 million in 1990, a decline of 30 percent. The walk to work mode share for these two years was 10.4 percent and 3.9 percent, respectively.
- From 1960 to 1990, the number of workers using public transportation as their main means of transportation to work declined 22 percent, from 7.8 million to 6.1 million. The resulting mode share for the work trip declined from 12.6 percent in 1960 to 5.3 percent in 1990.
- From 1960 to 1980, the number of workers working at home fell significantly from 4.7 million to 2.2 million, a decline of 53 percent; however, the number increased to 3.4 million in 1990, a 56 percent increase in the 1980s. As a result, the work at home share declined from 7.5 percent in 1960 to 2.3 percent in 1980 and increased to 3.0 percent in 1990.

Vehicle Occupancy

- Vehicle occupancies declined significantly from 1980 to 1990, as the share for driving alone increased substantially and all categories of carpooling (2-person, 3-person, etc.) showed declines in share over the same time period.
- The number of workers driving alone increased 35 percent, from 62.2 million in 1980 to 84.2 million in 1990. As a result, the proportion of workers driving alone increased from 64.4 percent to 73.2 percent over this time period.

- The number of workers in each carpool category declined from 1980 to 1990, including a 9 percent decline for 2-person carpools (13.3 to 12.1 million workers), a 40 percent decline for 3-person carpools (3.4 to 2.0 million workers), and a 46 percent decline for 4 or more person carpools (2.4 to 1.3 million workers).
- From 1980 to 1990, the commute share declined from 13.8 percent to 10.5 percent for 2-person carpools, from 3.5 percent to 1.7 percent for 3-person carpools, and from 2.5 percent to 1.1 percent for 4 or more person carpools.

Departure Time to Work

- The proportion of U.S. workers departing for work between 6 and 9 a.m. was approximately 70 percent from 1985 to 1991.
- This same proportion by region was approximately 72 percent for the northeast and south, and 68 percent for the midwest and west. From 1985 to 1991, little or no change was observed in this distribution for each region.
- In 1985, 1989, and 1991, the proportion of U.S. workers departing for work was 21 percent between 6 and 7 a.m., 32 percent between 7 and 8 a.m., and 17 percent between 8 and 9 a.m. The distribution of workers by departure time to work indicated virtually no change from 1985 to 1991.
- The same pattern also was observed for workers departing in off-peak times with virtually no change in the percentage distribution over time.

Travel Time and Distance to Work

- The distribution of travel times to work remained stable in all travel time categories from 1985 to 1991.
- In the U.S., approximately 35 percent of work trips took less than 15 minutes, 34 percent took 15 to 29 minutes, and 14 percent took 30 to 44 minutes.

- Travel distance to work appears to be increasing as the proportion of shorter work trips has declined, while the proportion of longer work trips has increased.
- Given that travel times remained stable and travel distance appears to have increased, the result clearly suggests an increase in average speed.
- Travel time to work was shortest in the midwest and longest in the northeast, while the south and west had similar travel times in between.
- Travel distance was shorter in the south and west relative to the northeast and midwest, as indicated by the proportion of work trips in the “less than 1 mile” and “1 to 4 mile” categories.
- Travel time to work for the Black population appeared to be generally longer than for the population as a whole, while the Hispanic and elderly populations were close to the national distribution.
- Despite the longer travel times to work, the data suggest that the Black population have shorter distances to travel to work than the national average.
- Travel distance to work also appeared to be shorter than the national average for both the Hispanic and elderly populations.
- The travel time and travel distance to work for commuters below the poverty level were both lower than for the U.S. population as a whole.
- The data suggest that travel time and travel distance to work for suburban residents were generally longer than for the U.S. as a whole.
- In contrast, travel time and travel distance for workers living outside the metropolitan area were much shorter than the national average.
- The travel distance for central city residents appears to be shorter than the U.S. total, while travel time appears to be similar to the U.S. as a whole (perhaps slightly shorter).

COMMUTING ALTERNATIVE TRENDS AND MARKETS

Recent trends and potential markets for commuting alternatives are compiled and assessed for public transportation, ridesharing, and working at home. Commuting through the use of these alternatives is reported for a variety of geographic, demographic, and housing characteristics. Although much of the data confirms expectations regarding the traditional characteristics of the users of commuting alternatives, the information is useful since it provides recent trends over a shorter period of time than is typically available in national databases. The American Housing Survey (AHS) is used to define potential markets, which provides journey-to-work data in 1985, 1989, and 1991. A summary of trends and markets for these commuting alternatives is provided in Table 1.

THE FUTURE OF COMMUTING ALTERNATIVES

A discussion of the future of each of these commuting alternatives is also presented. These discussions are based primarily on the literature and national studies that have been conducted to assess the future outlook of each of the respective alternatives. Recommendations are provided for each commuting alternative that may contribute to a greater probability of maintaining, and perhaps increasing, commute mode share. These recommendations are summarized below.

Public Transportation

Four major recommendations are identified as being important for the future success of public transportation based on review of several national policy studies, along with other literature discussing the future of public transportation. These recommendations are identified and discussed below.

1. Incorporate New Management Strategies

The transit system of the future cannot continue to operate based on the traditional view of the transit organization. In order to achieve success, transit systems

Table 1
Summary of Mode Share Trends and Markets (AHS), percent

	Transit			Ridesharing			Working at Home		
	1985	1989	1991	1985	1989	1991	1985	1989	1991
UNITED STATES	5.1	4.6	4.8	14.1	11.8	12.0	3.0	2.6	2.6
REGION									
Northeast	12.4	10.7	11.4	12.6	10.4	10.4	2.8	2.3	2.2
Midwest	3.4	3.3	3.4	12.8	10.5	10.7	4.1	2.9	3.2
South	2.6	2.2	2.4	16.5	13.1	12.8	2.4	2.2	2.0
West	3.8	3.9	3.7	13.2	12.7	13.7	2.6	2.9	3.2
DEMOGRAPHIC SUBGROUPS									
Black	15.3	14.7	13.8	18.9	15.4	15.7	0.7	0.7	0.8
Hispanic	10.3	9.2	10.3	19.3	19.0	20.3	1.4	1.5	1.4
Elderly (65+)	7.1	5.3	5.3	12.9	10.7	10.4	6.8	4.9	5.9
Poverty Level	8.5	6.8	7.5	17.7	17.0	16.3	6.7	5.4	5.3
RESIDENTIAL LOCATION									
Central City	11.5	10.7	10.7	13.0	12.1	12.5	2.0	1.7	1.9
Suburb	3.1	2.6	3.0	13.9	11.3	11.1	2.5	2.4	2.4
Outside MSA	0.5	0.4	0.5	16.1	12.7	13.4	5.5	4.2	4.1
Urban	6.7	6.1	6.3	13.3	11.5	11.8	2.1	2.0	2.1
Rural	0.5	0.5	0.6	16.3	12.7	12.5	5.5	4.2	4.0
HOUSEHOLD CHARACTERISTICS									
Owner	3.2	2.7	2.8	13.7	11.0	10.8	3.3	2.9	3.0
Renter	9.2	8.6	8.9	14.9	13.6	14.6	2.2	1.9	1.7
New Construction (4 years)	1.3	2.1	2.0	15.0	10.0	11.5	2.1	2.4	2.5
Moved in Last Year	5.3	5.3	5.8	15.7	13.9	14.7	1.7	1.7	1.5
Mobile Home	0.6	0.3	0.6	19.4	16.0	16.4	1.9	2.2	1.8
Severe Housing Problem	15.9	7.7	8.6	22.2	13.0	12.7	2.7	2.5	4.2
Moderate Housing Problem	8.6	7.5	6.1	19.7	19.7	17.2	2.3	2.6	2.8

must foster a working environment that can quickly and easily adapt to the changing needs of its users. Perkinson referred to it as a service organization in contrast to the more traditional infrastructure organization. Barker emphasizes the importance of involving employees at all levels in the decisionmaking process. Meyer's recommendations included the need for a sales-oriented organizational structure. This approach to management in the transportation industry is often referred to as mobility management, where transit systems find ways to transport patrons by whatever means is most convenient and cost effective.

2. Focus on Traditional Transit Markets

The transit industry should focus the majority of its efforts on markets and services that they have traditionally served well. Service for the traditional suburb-to-central city journey to work and circulation within the central city has been the "bread and butter" for most transit systems in the past several decades. Despite suburb-to-suburb travel becoming the predominant commute flow pattern, growth in the traditional suburb-to-central city commute flow has been substantial. Efforts to serve suburb-to-suburb travel with fixed-route public transportation service are extremely expensive and have proven to be largely unproductive.

3. Anticipate Future Market Opportunities for Specialized Services

Although the focus should be on traditional transit markets, transit systems should anticipate future market opportunities for specialized services. Niche markets will be the key to the industry's future beyond traditional service. Examples of service concepts and markets that may be appropriate in the future for many transit systems include:

- neighborhood transit services
- jitney services
- expanded paratransit
- fare strategies and payment methods targeted toward specific markets

- employer partnerships
- privatization and brokerage
- smaller vehicles
- transportation demand management strategies
- reverse commute services
- intermodal feeder/distributor services
- time transfer/pulse services

An important research project for the transit industry is about to begin as part of the Transit Cooperative Research Program. Entitled *Transit Markets of the Future-The Challenge of Change* (Research Project H-4B), this research project is expected to result in a detailed characterization of existing and future transit markets and recommended service and product concepts that will best serve these markets.

4. Strategically Incorporate Technological Innovation

Technological factors will play a significant role in travel decisions in the coming decades and could potentially contribute to changes in the performance of transit services relative to other modes, including factors related to the following performance areas and impacts:

- technology-driven changes in comparative costs
- safety
- comfort/convenience
- energy and air quality impacts
- fare payment methods
- ease of use (ITS/APTS impacts)
- reliability

However, the most important factor in the incorporation of technological innovation into daily transit operations was identified by Barker, when he indicated that the first step in implementing a technological innovation is the consideration of the people. Are the right employees available to implement the technology? Will employees perceive a benefit from the technology such that they will support its

implementation? New technology does not necessarily result in better service. The employees who control the technology must ensure that it is used properly so that potential benefits can be achieved.

Ridesharing

Based on recent trends and a review of literature on ridesharing, four major recommendations are offered. These recommendations stem from the need for carpool programs and Travel Demand Management (TDM) organizations in general to more effectively adapt to evolving demographic and geographic trends in the U.S.

1. Identify and Learn From Areas of Success

TDM efforts need to be evaluated objectively so resources can be focused on proven actions. In the process of evaluating carpooling trends in localized areas, some geographic areas can be identified where carpooling has remained relatively stable or even increased from 1980 to 1990, both in absolute terms and in commute share. These areas can be identified at any geographic level using Census data, i.e., county, place, census tract, block group. Additional research should then be conducted on these successful areas to serve as case studies to identify the reasons for success and what specific actions could be applied in other areas. For example, a carpool program that serves a county could review the trends in carpool share for each census tract within that county. The characteristics of commuters residing in tracts in which the carpool share remained stable or increased could be identified and analyzed along with the characteristics of the commute (travel time, origin/destination, etc.). Significant potential exists for learning from tracts exhibiting a greater propensity to carpool.

For guidance on the implementation of TDM measures, see "Making TDM Work in Your Community" by CUTR and *Implementing Effective Travel Demand Management Measures: A Series on TDM* by Comsis, et al.

2. Reconsider Focus of Program

The traditional focus of carpool programs has been on urban travel, with the primary objective being to market

the program to employees of large businesses and companies within major activity centers. Programs should consider focusing efforts on rural residents who commute long distances to cities. Longer commutes, both in distance and time, have traditionally been an important element in the carpool decision. Based on an evaluation of carpooling trends at the county level in North Carolina, Hartgen suggests that serious consideration should be given to replacing employer-focused programs in urban areas with residence-based programs in rural areas. Agencies interested in pursuing this type of program should be aware that efforts such as these can result in some institutional conflicts between residential- and employer-focused programs that serve many of the same trips. Conflict usually arises when trying to determine which program should receive credit for these trips.

3. Use Target Marketing

In Section 4 of the final report, the carpool share for the journey to work was presented for worker subgroups according to a series of demographic, geographic, and housing characteristics. The purpose of this effort was to identify market segments that appear to have a greater probability of carpooling based on the results of AHS surveys. There is some disagreement in the literature regarding whether this type of information is useful in predicting carpool formation. However, a review of descriptive statistics compiled from the AHS clearly indicates that certain market segments have a significantly greater carpool share than the national average.

Traditionally, organizations charged with encouraging and facilitating travel demand management initiatives, including ridesharing, have focused on the work destination side of the commute and especially during peak travel periods, i.e., 6 a.m. to 9 a.m. This makes sense since it is logical to assume that workers with commute destinations that are in close proximity would be good candidates for carpooling. In addition, nearly 62 percent of all vehicle trips made during the morning peak are home-based work trips. The focus on this major market should continue. However, marketing efforts should be considered in an effort to penetrate other more specific market segments.

Efforts to penetrate specific market segments could be initiated with two distinctly different approaches, including

emphasis on the residential end or emphasis on the employment end. Narrowing the focus through target marketing should reduce not only the cost of undertaking some marketing initiatives but also be more effective in reaching individuals who are more likely to participate in a carpool. The two approaches are discussed below.

Residential End - As indicated previously, recent trends in the use of carpools can be used to identify existing and evolving market segments that appear to have a greater probability of becoming involved in a carpool. Once these market segments have been identified, the specific characteristics of these segments must be located geographically within the region in which a given TDM organization serves. For many characteristics, this can be accomplished using Census data, which provide demographic and housing information at geographic levels down to the census tract and block group. Once certain tracts or block groups have been identified that include concentrations of these market segments, marketing efforts can be focused within these more limited geographic areas.

Employment End - One of the primary objectives of most TDM organizations is the development of a database of potential carpool applicants and the preparation of matchlists for these applicants in order to assist in carpool formation. The information collected from potential applicants usually includes characteristics such as those used to distinguish market segments using the AHS. Individuals with characteristics that suggest a greater probability for carpool formation could be specifically targeted for more aggressive marketing techniques, such as direct mail marketing or telephone solicitation.

4. Develop Evaluation Program

Many TDM programs in the U.S. do not have adequate evaluation programs. Without an effective evaluation mechanism, there is no way for a program to determine if what they are doing is working. The objective should not be to count the number of matchpool applicants. Evaluation criteria should be the number of persons placed in carpools, how long they are maintained, and the change in share of total trips. Emphasis on reasonable and defensible evaluation measures and increased accountability should be a major goal of all TDM organizations.

These four recommendations do not provide all the answers. They do provide, however, a starting point from which various carpool programs and TDM organizations can initiate some objective research for determining what the best approaches will be for a given local area.

Working at Home

The type of employment of individuals working at home can vary significantly, from farmers to self-employed individuals to telecommuters in the strict sense of the word. Data collected in national surveys, such as the Decennial Census and American Housing Survey, do not distinguish between these subcategories of working at home. Therefore, specific information regarding the proportion of workers in these subcategories is uncertain. For the purposes of this discussion, the focus is confined to telecommuting, which is defined as working at home or at an alternate location and communicating with the usual place of work using electronic or other means, instead of physically traveling to a more distant worksite. The decision was made to focus on telecommuters since this population segment is believed to be largely untapped in a time period characterized by significant technological advances in telecommunications.

There is not always agreement in the literature on the rate of growth of telecommuting, the presence and magnitude of its potential advantages and disadvantages, and the extent to which these advantages and disadvantages will affect the transportation system. However, current literature tends to concede on what conditions are necessary within an organization to achieve the maximum possible benefits from a telecommuting program. The most commonly stated preconditions are listed below:

- **Suitable job** - The work must be able to be performed (at least in part) at a remote location.
- **Suitable employees** - The personal characteristics and abilities of the employee must be suited to working with no direct supervision.
- **Suitable telecommuting workplace** - The employee must have a place to work that is free of distractions.

- **Top-down support is vital** - The organization must consider telecommuting as a reasonable and desirable alternative. Senior management must provide support.
- **Senior management support is necessary** - All managers and decisionmakers within the organization must accept the idea and practice of telecommuting.
- **Telecommuters and their supervisors must be willing participants** - Both employees and managers must feel comfortable with telecommuting in terms of its suitability to personal work habits, its effects on social interaction and career advancement, and its impacts on management style and the organization.
- **Training is key** - Significantly higher performance results are noted when both the telecommuters and their direct supervisors participated in telecommuting-specific training prior to initiating a program.
- **Availability of adequate, cost-effective technology** - It is essential that telecommuters have sufficient technological equipment to work at home. However, most of the literature finds that major capital investments are not necessary.

It is clear that a better understanding of telecommuting and its potential market will be necessary to properly incorporate this technique into today's travel demand management arsenal. Knowledge on which jobs and individuals are amenable to the prospect of telecommuting is important to its future success, as is understanding why people will or will not choose to participate in or support telecommuting. The success of subsequent telecommuting programs will depend on proper implementation, the support of all parties involved, and the avoidance of the pitfalls that predecessors may have encountered. Since many benefits will be realized no matter if the level of implementation is national, regional, or merely local, it is imperative that planners and decisionmakers concentrate on starting telecommuting programs, and not on potential limiting factors or projections of future participation.

Changing demographic and travel behavior characteristics have resulted in significant challenges for transportation decisionmakers, planners, and practitioners throughout the United States. Efforts to meet these challenges have had varying degrees of success and/or failure and, as we look to the future, it appears that dealing with existing and evolving transportation problems will only become more difficult.

The factors influencing transportation problems are similar in growing metropolitan areas throughout the nation. The increasing participation of women in the labor force, the baby boom generation entering the labor market, and suburbanization of development have all contributed greatly to problems related to congestion, air quality, energy, safety, and the overall quality of life.

Commuting in the United States has evolved substantially over the past several decades, from the more traditional commute with a majority of destinations in the central business district to new travel patterns where commuting from suburb to suburb has grown to be the dominant commuting pattern. These new patterns have been most effectively characterized by Pisarski in *Commuting in America: A National Report on Commuting Patterns and Trends*, perhaps the most widely-referenced document on modern commuting in the United States.

The purpose of this report is to provide a foundation for the development of a thorough understanding of recent commuting trends in the United States. Based on these trends and a review of the literature, the future of commuting and, specifically, commuting alternatives is discussed. The primary objective is to develop a complete understanding of recent trends in commuting alternatives and to offer opinions on the future of each alternative. In this report, commuting alternatives include public transportation, ridesharing, and working at home.

Overview of Report

The report is organized into seven major sections including this introduction and an appendix. Each of the subsequent sections is summarized below.

Section 2 presents national commuting trends, including data on commuting relative to all personal travel, mode choice, vehicle occupancy, departure time to work, travel time to work, and travel distance to work.

Section 3 reviews recent trends in the use of public transportation for the journey to work. The transit share of the journey to work is identified for a variety of geographic, demographic, and housing characteristics. In addition, public transportation availability and the reported satisfaction of transit users is presented, along with a measure of frequency of use.

Section 4 presents recent trends in the use of ridesharing for the journey to work. Similar to the section on public transportation, the carpool share of the journey to work is presented for a variety of geographic, demographic, and housing characteristics.

Section 5 looks at recent trends in working at home. The work-at-home share is determined for individuals characterized by different geographic, demographic, and housing characteristics.

Section 6 concludes the report with a look at the future of commuting alternatives in the United States. Based on recent trends and a review of the literature, opinions are offered regarding the future of commuting for the more than 115 million workers in the United States.

Appendix A provides urban area comparisons with a database of population, demographic, and journey-to-work information from the 1990 decennial census. All urban areas with a population exceeding 500,000 are included in rankings for a series of 25 variables. These data are useful in assisting the transportation planning community by identifying similar areas around the country and then determining how these areas are attempting to deal with transportation problems.

This publication provides a comprehensive look at historical trends in commuting in the United States and should prove useful to planning agencies, transit systems, decisionmakers, the business community, and the general public.



2 NATIONAL COMMUTING TRENDS

Commuting in the U.S. has evolved substantially over the past several decades, from the more traditional commute with a majority of destinations in the central business district to new travel patterns where commuting from suburb to suburb has evolved to be the dominant commute flow pattern. Familiarity with the general characteristics and trends in commuting in general is an important element in the development of a thorough understanding of the commuting alternatives discussed in the remainder of this report.

This section looks at national commuting trends using data from the Decennial Census, AHS, and NPTS. Trends are presented for the following travel behavior areas:

- **National Travel Summary** - The national travel summary presents trends in all personal travel, including annual person trips, annual person miles of travel, person trips per capita, person miles of travel per capita, and average person trip length. In addition, the distribution of person trips by trip purpose also is presented.
- **Commute Mode Choice** - Mode choice for the journey to work is summarized in terms of the absolute changes in numbers of workers, as well as the change in mode share over time.
- **Vehicle Occupancy** - Data are presented regarding recent trends in vehicle occupancies, including a summary of changes in the absolute and percent share change in the use of the single occupant vehicle and 2-, 3-, and 4-person carpools.
- **Departure Time to Work** - Departure time to work is summarized for the U.S. and its regions. The data include a look at the proportion of commuters departing for work during the morning peak hours (6 to 9 a.m.).
- **Travel Time and Distance to Work** - In addition to presenting trends in travel time and distance to work for all U.S. commuters, this information also is presented by region, for demographic subgroups, and for commuters by residential location.

National Travel Summary



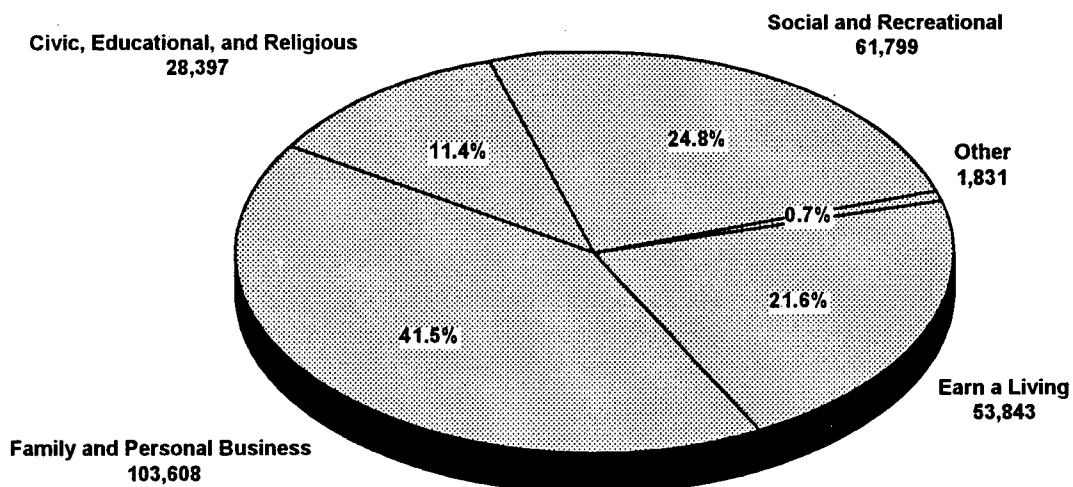
- According to the NPTS, U.S. population rose from over 197 million in 1969 to over 239 million in 1990, an increase of 21 percent.
- The number of annual person trips increased 72 percent, from just over 145 billion in 1969 to nearly 250 billion in 1990.
- Similarly, a 65 percent increase was observed for annual person miles of travel, from 1,404 billion in 1969 to 2,315 billion in 1990.
- The number of annual persons trips per capita increased from 736 in 1969 to 1,042 in 1990, an increase of 42 percent.
- Annual person miles of travel per capita increased 36 percent, from 7,120 miles in 1969 to 9,671 miles in 1990.
- Average person trip length declined by 4 percent, from 9.67 miles in 1969 to 9.45 miles in 1990.
- Nearly 22 percent of all person trips are made as part of earning a living, including commuting to work and other job-related trips.
- According to the 1990 NPTS, nearly 62 percent of all vehicle trips made in the morning peak (6 a.m. to 9 a.m.) are home-based work trips.

Table 2
Summary of National Travel
(1969, 1977, 1983, and 1990 NPTS)

	1969	1977	1983	1990	% Change 1969-90
Persons (000)	197,213	213,141	229,453	239,416	21%
Annual Person Trips (000)	145,146,000	211,778,000	224,385,000	249,562,000	72%
Annual Person Miles of Travel (000)	1,404,137,000	1,879,215,000	1,946,662,000	2,315,273,000	65%
Annual Person Trips per Capita	736	994	978	1,042	42%
Annual Person Miles of Travel per Capita	7,120	8,817	8,484	9,671	36%
Average Person Trip Length (miles)	9.67	8.87	8.68	9.45	-4%

Source: USDOT, Federal Highway Administration, *1990 Nationwide Personal Transportation Survey, 1990 NPTS Databook, Volume 1* (November 1993), p. 4-4.

Figure 1
Number and Percent of Person Trips by Trip Purpose
1990 NPTS (millions)



Commute Mode Choice



- The number of workers using the private vehicle as the main means of transportation to work (driving alone and ridesharing) increased from 41.4 million in 1960 to 99.6 million in 1990, an increase of 141 percent. The mode share increased from 67 percent to 87 percent over the same time period.
- From 1980 to 1990, the number of workers driving to work alone increased from 62.2 million to 84.2 million, a growth rate of 35 percent. The share of work travel for driving alone increased from 64.4 percent in 1980 to 73.2 percent in 1990.
- All commuting alternatives experienced declines in mode share in each of the past three decades, with the one exception of working at home in 1990.
- Distinguished as a separate mode starting in 1980, the number of workers carpooling to work decreased from 19.1 million in 1980 to 15.4 million in 1990, a decline of 19 percent. The mode share also declined from 19.7 percent in 1980 to 13.4 percent in 1990.
- The number of workers walking to work decreased from 6.4 million in 1960 to 4.5 million in 1990, a decline of 30 percent. The walk to work mode share for these two years was 10.4 percent and 3.9 percent, respectively.
- From 1960 to 1990, the number of workers using public transportation as their main means of transportation to work declined 22 percent, from 7.8 million to 6.1 million. The resulting mode share for the work trip declined from 12.6 percent in 1960 to 5.3 percent in 1990.
- From 1960 to 1980, the number of workers working at home fell significantly from 4.7 million to 2.2 million, a decline of 53 percent; however, the number increased to 3.4 million in 1990, a 56 percent increase in the 1980s. As a result, the work at home share declined from 7.5 percent in 1960 to 2.3 percent in 1980 and increased to 3.0 percent in 1990.

Figure 2
Distribution of Mode Choice for Commute to Work
(1960-1990 census data)

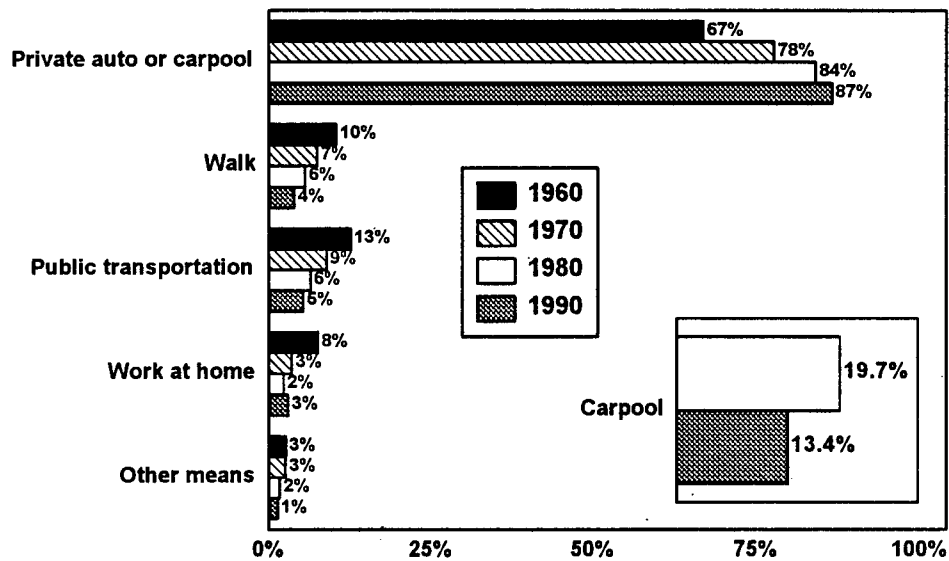
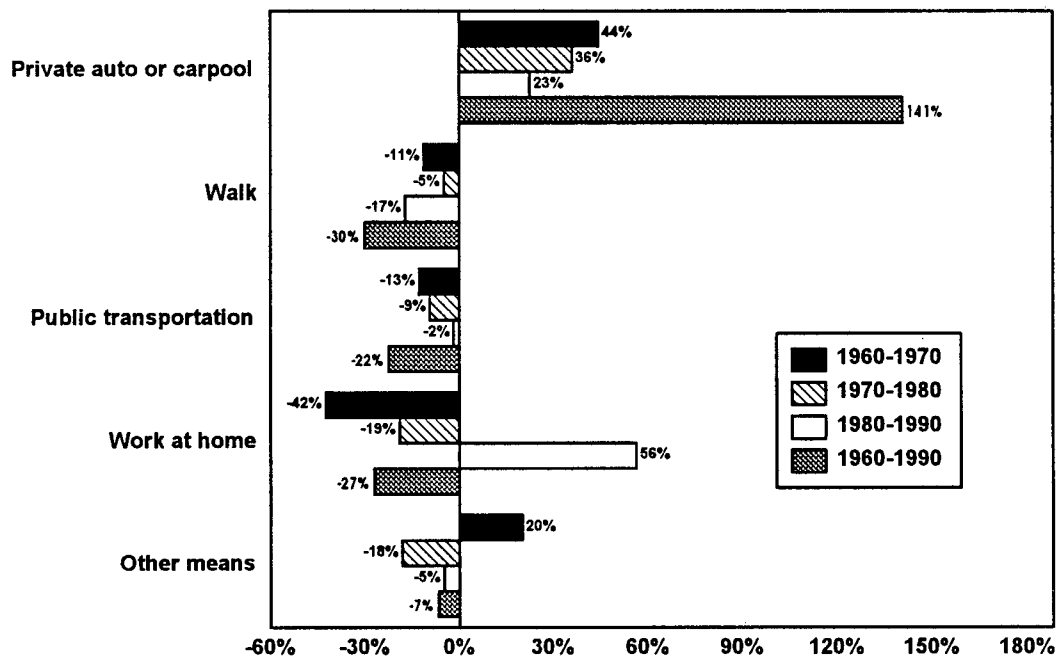


Figure 3
Growth Rates in Number of Workers by Commute Mode (1960-1990 census data)



Vehicle Occupancy



- Vehicle occupancies declined significantly from 1980 to 1990, as the share for driving alone increased substantially and all categories of carpooling (2-person, 3-person, etc.) showed declines in share over the same time period.
- The number of workers driving alone increased 35 percent, from 62.2 million in 1980 to 84.2 million in 1990. As a result, the proportion of workers driving alone increased from 64.4 percent to 73.2 percent over this time period.
- The number of workers in each carpool category declined from 1980 to 1990, including a 9 percent decline for 2-person carpools (13.3 million workers to 12.1 million workers), a 40 percent decline for 3-person carpools (3.4 million workers to 2.0 million workers), and a 46 percent decline for 4 or more person carpools (2.4 million workers to 1.3 million workers).
- From 1980 to 1990, the commute share declined from 13.8 percent to 10.5 percent for 2-person carpools, from 3.5 percent to 1.7 percent for 3-person carpools, and from 2.5 percent to 1.1 percent for 4 or more person carpools.

Figure 4
Vehicle Occupancy for Commute to Work (1980-1990 census data)

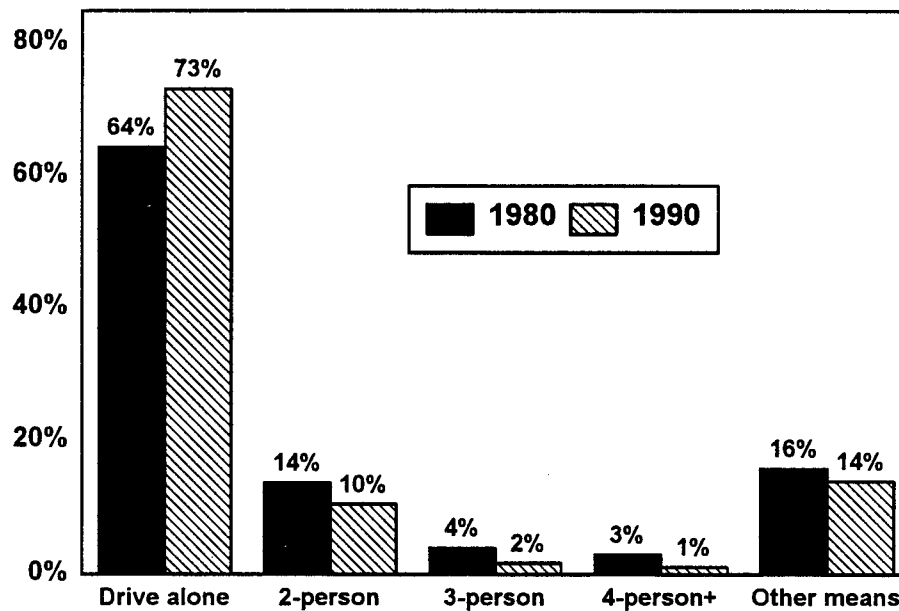
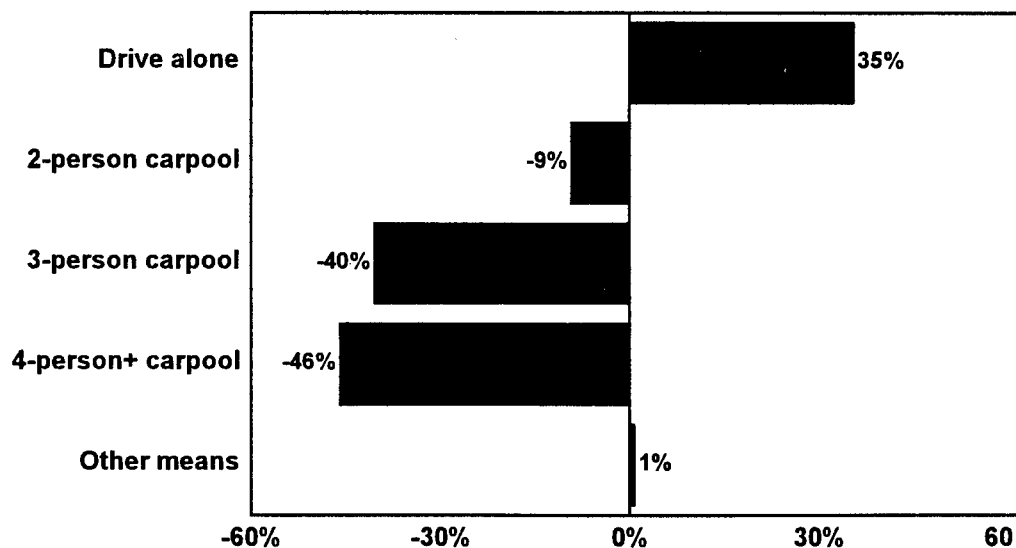


Figure 5
Growth Rate in Number of Workers by
Vehicle Occupancy (1980-1990 census data)



Departure Time to Work



- The proportion of U.S. workers departing for work between 6 and 9 a.m. was approximately 70 percent from 1985 to 1991.
- This same proportion by region was approximately 72 percent for the northeast and south, and 68 percent for the midwest and west. From 1985 to 1991, little or no change was observed in the distribution for each region.
- In 1985, 1989, and 1991, the proportion of U.S. workers departing for work was 21 percent between 6 and 7 a.m., 32 percent between 7 and 8 a.m., and 17 percent between 8 and 9 a.m. The distribution of workers by departure time to work indicated virtually no change from 1985 to 1991.
- The same pattern also was observed for workers departing in off-peak times with virutally no change in the percentage distribution over time.

Figure 6
Percent of Commuters Departing for Work Between
6 and 9 a.m. by Region (1985-1991 AHS)

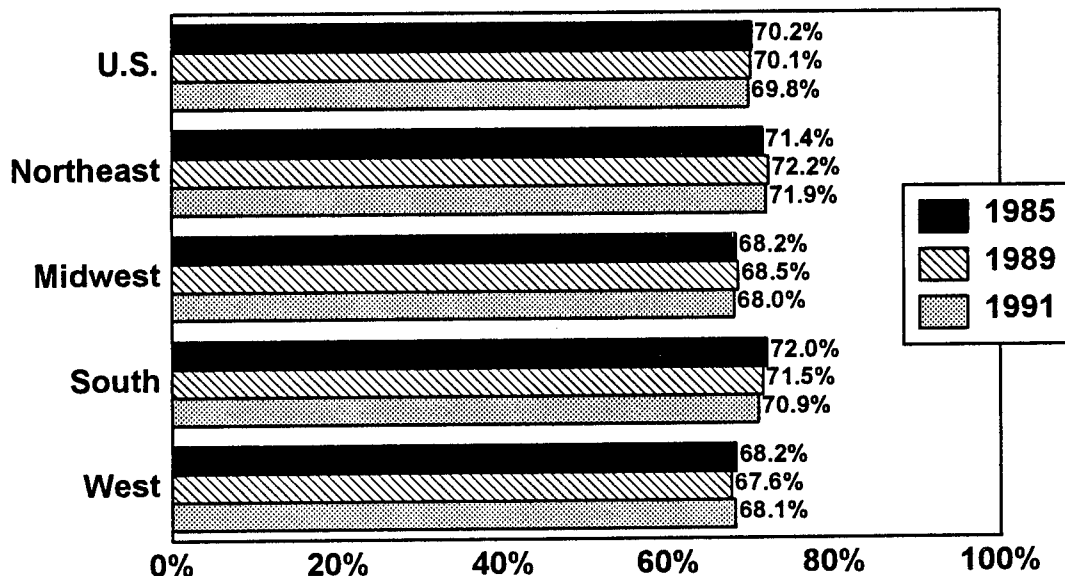
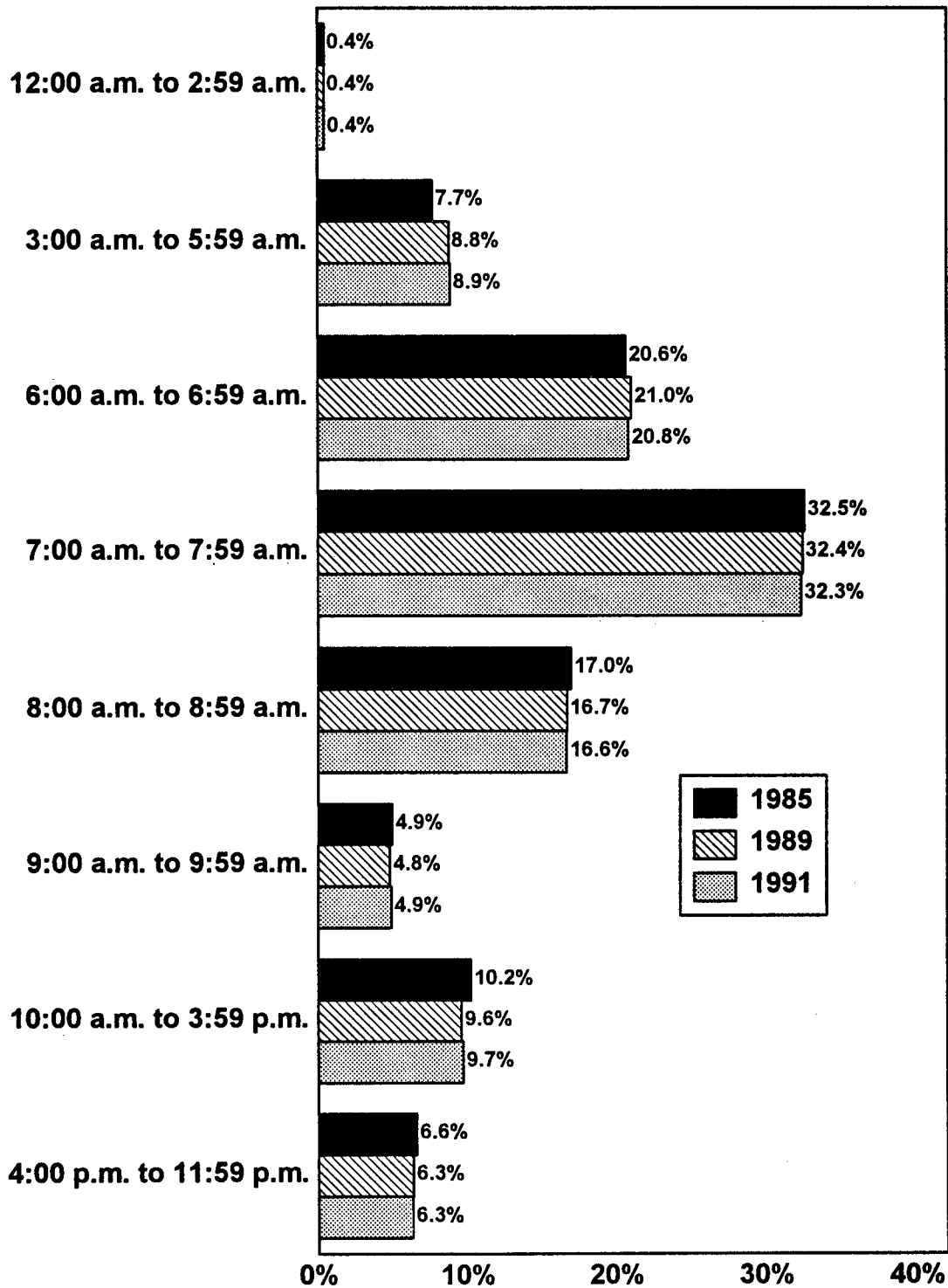


Figure 7
Departure Time to Work (1985-1991 American Housing Survey)



Travel Time and Distance to Work



- The distribution of travel times to work remained stable in all travel time categories from 1985 to 1991.
- In the U.S., approximately 35 percent of work trips took less than 15 minutes, 34 percent took 15 to 29 minutes, and 14 percent took 30 to 44 minutes.
- Travel distance to work appears to be increasing as the proportion of shorter work trips has declined, while the proportion of longer work trips has increased.
- Given that travel times have remained stable and that travel distance appears to have increased, the result clearly suggests an increase in average speed.
- Travel time to work was shortest in the midwest, longest in the northeast, while the south and west had similar travel times in between.
- Travel distance was shorter in the south and west relative to the northeast and midwest, as indicated by the proportion of work trips in the "less than 1 mile" and "1 to 4 mile" categories.
- Travel time to work for the Black population appeared to be generally longer than for the population as a whole, while the Hispanic and elderly populations were close to the national distribution.
- Despite the longer travel times to work, the data suggest that the Black population have shorter distances to travel to work than the national average.
- Travel distance to work also appeared to be shorter than the national average for both the Hispanic and elderly populations.
- The travel time and travel distance to work for commuters below the poverty level were both lower than for the U.S. population as a whole.
- The data suggest that travel time and travel distance to work for suburban residents were generally longer than for the U.S. population as a whole.
- In contrast, travel time and travel distance for workers living outside the metropolitan area were much shorter than the national average.
- The travel distance for central city residents appears to be shorter than the U.S. total, while travel time appears to be similar to the U.S. as a whole (perhaps slightly shorter).

Figure 8
Travel Time to Work, United States (1985-1991 AHS)

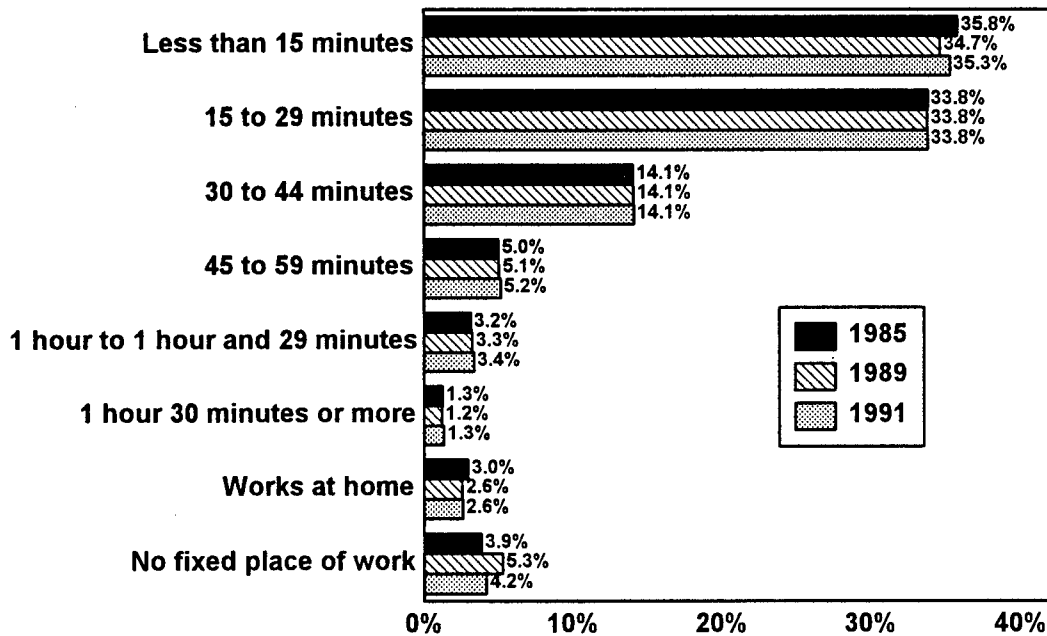


Figure 9
Travel Distance to Work, United States (1985-1991 AHS)

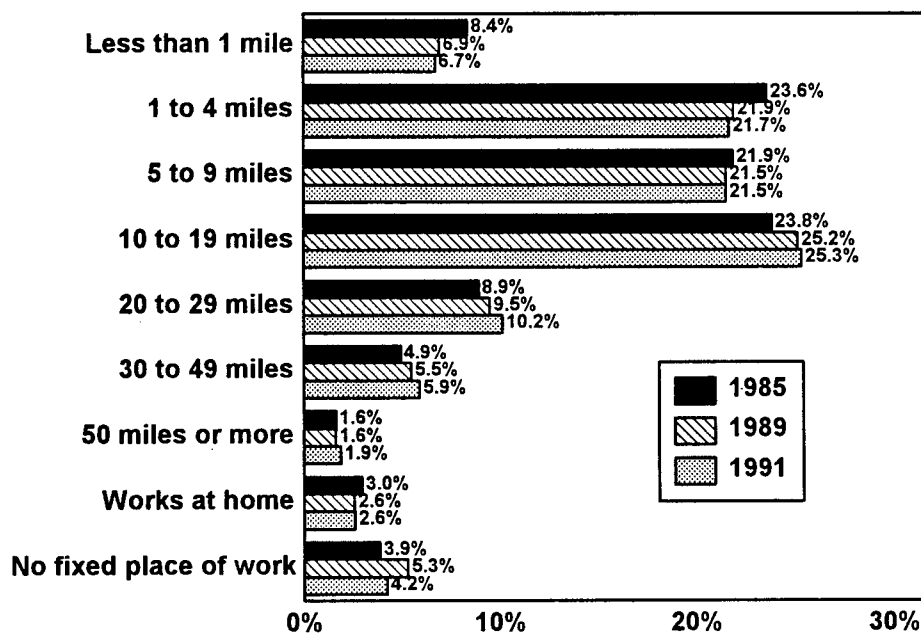


Figure 10
Travel Time to Work by Region of the U.S. (1991 AHS)

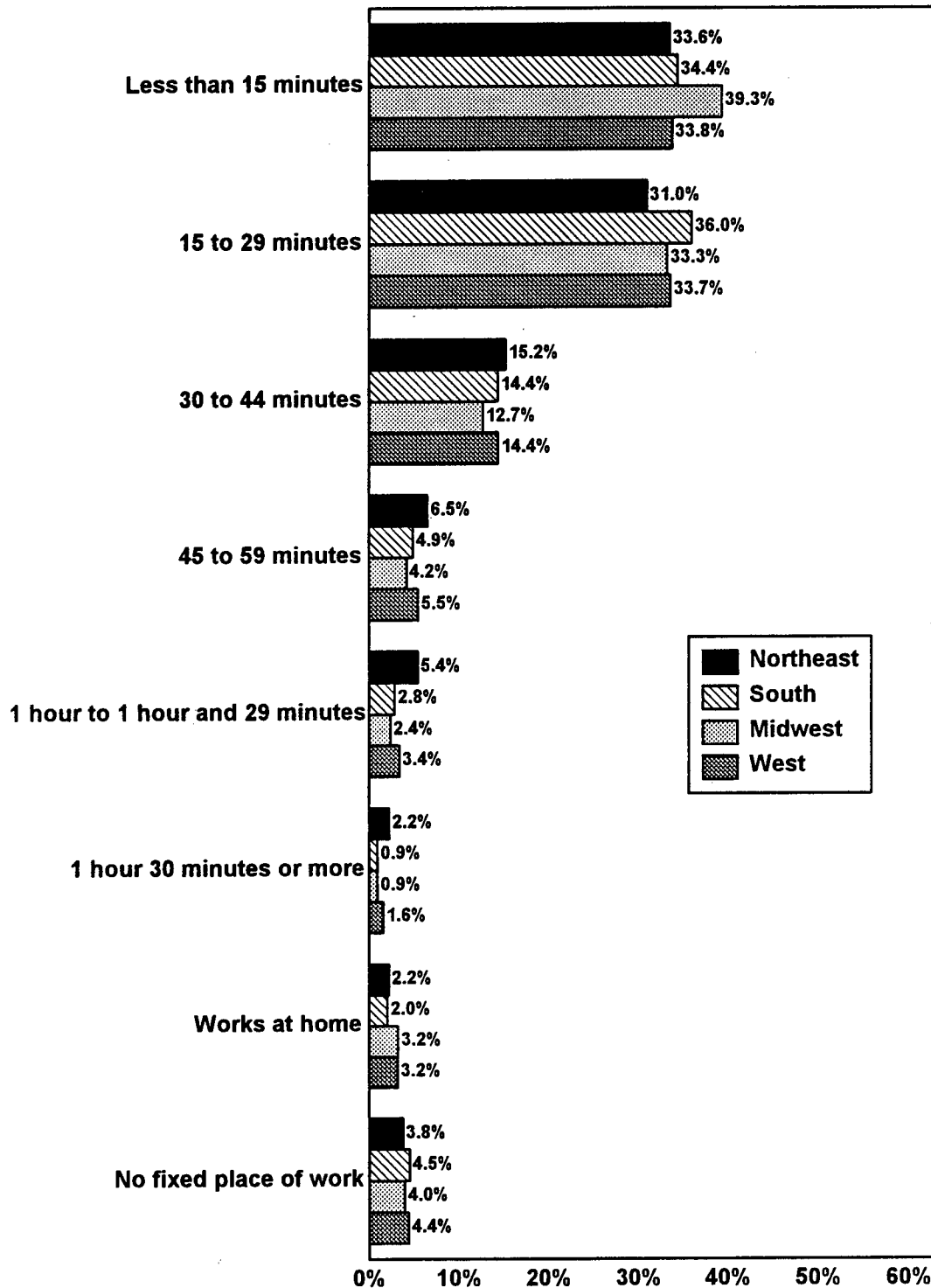


Figure 11
Travel Distance to Work by Region of the U.S. (1991 AHS)

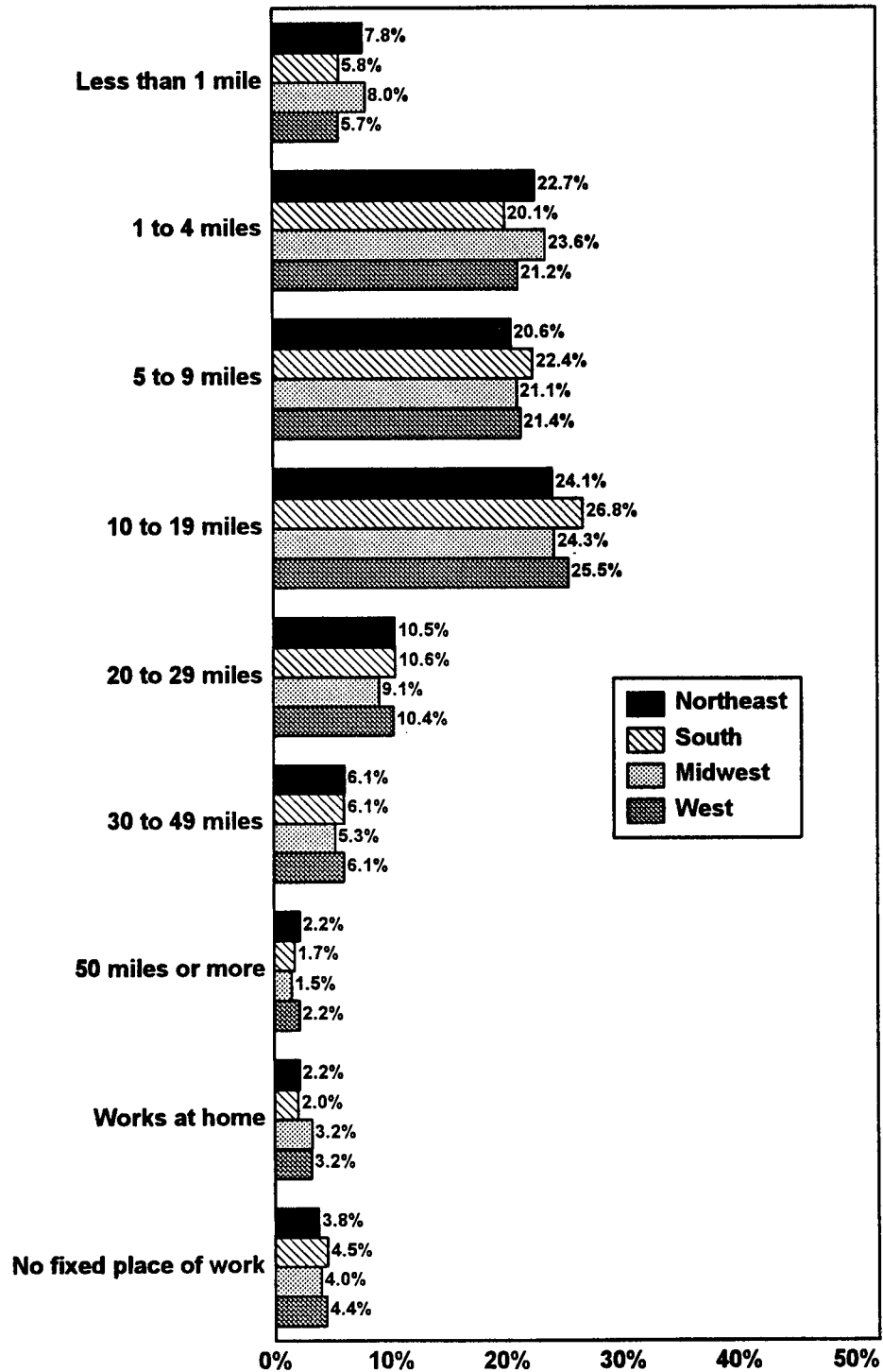


Figure 12
Travel Time to Work, Selected Demographic Subgroups (1991 AHS)

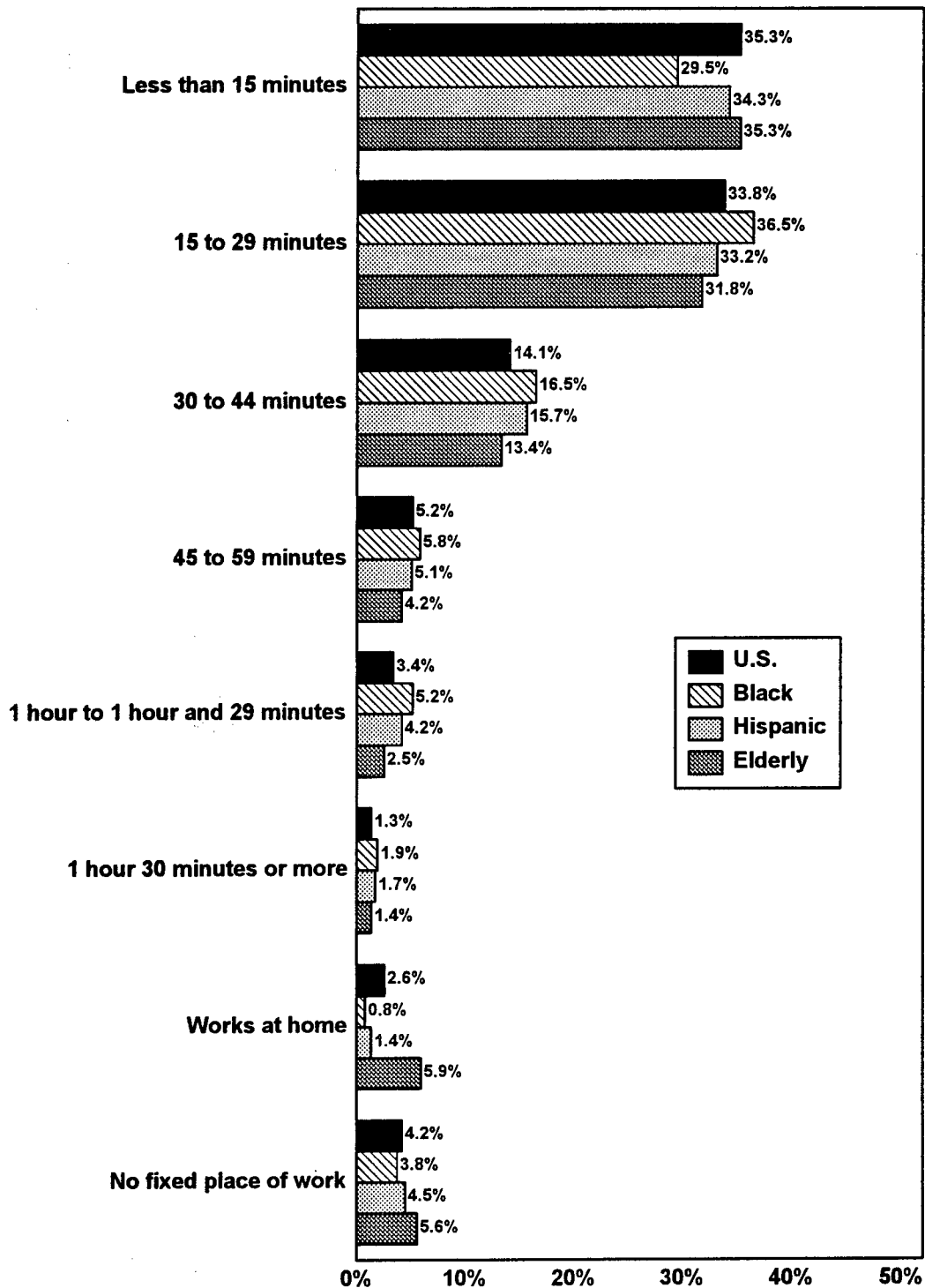


Figure 13
Travel Distance to Work, Selected Demographic Subgroups (1991 AHS)

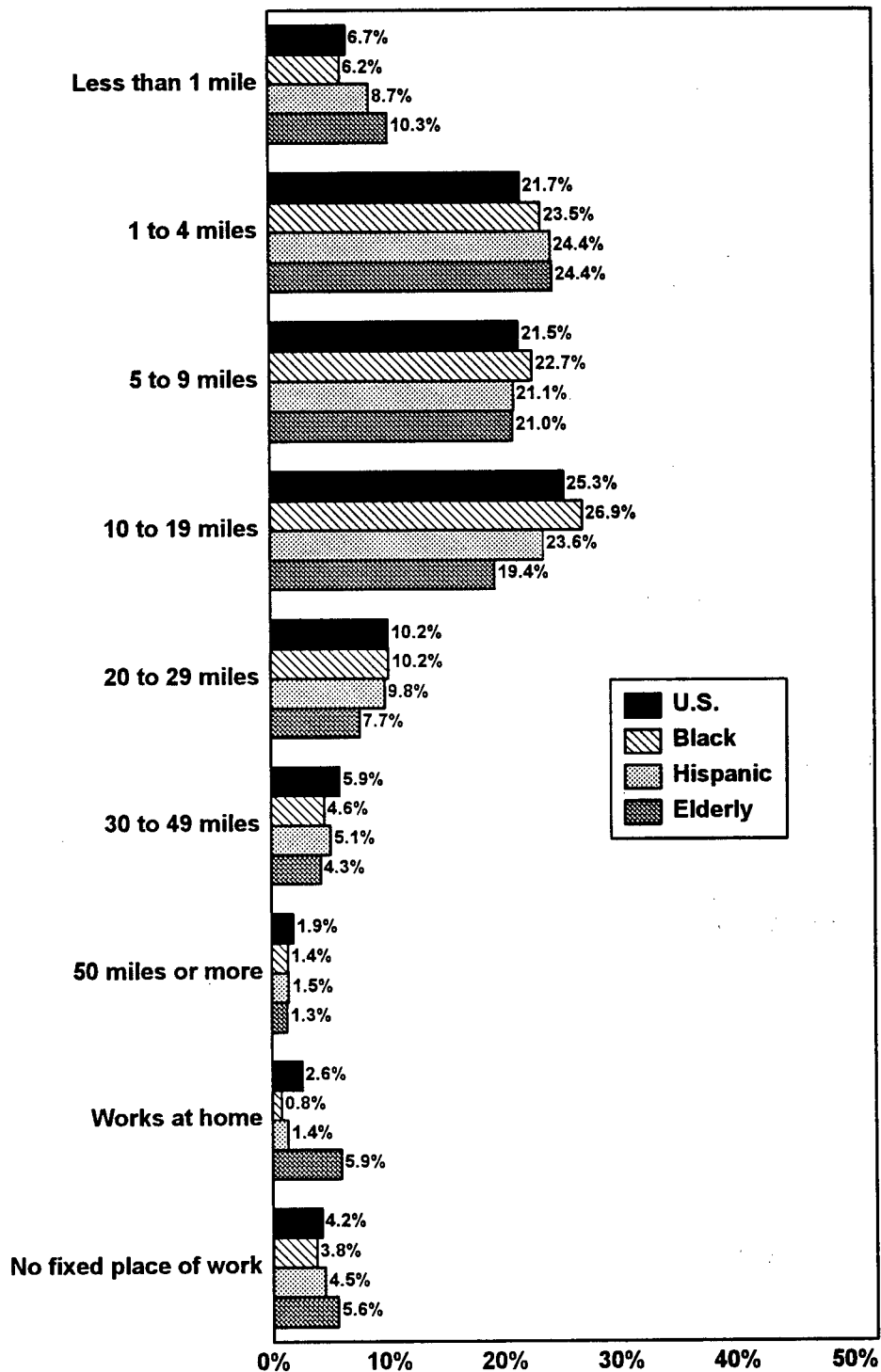


Figure 14
Travel Time to Work, Commuters Below Poverty Level (1991 AHS)

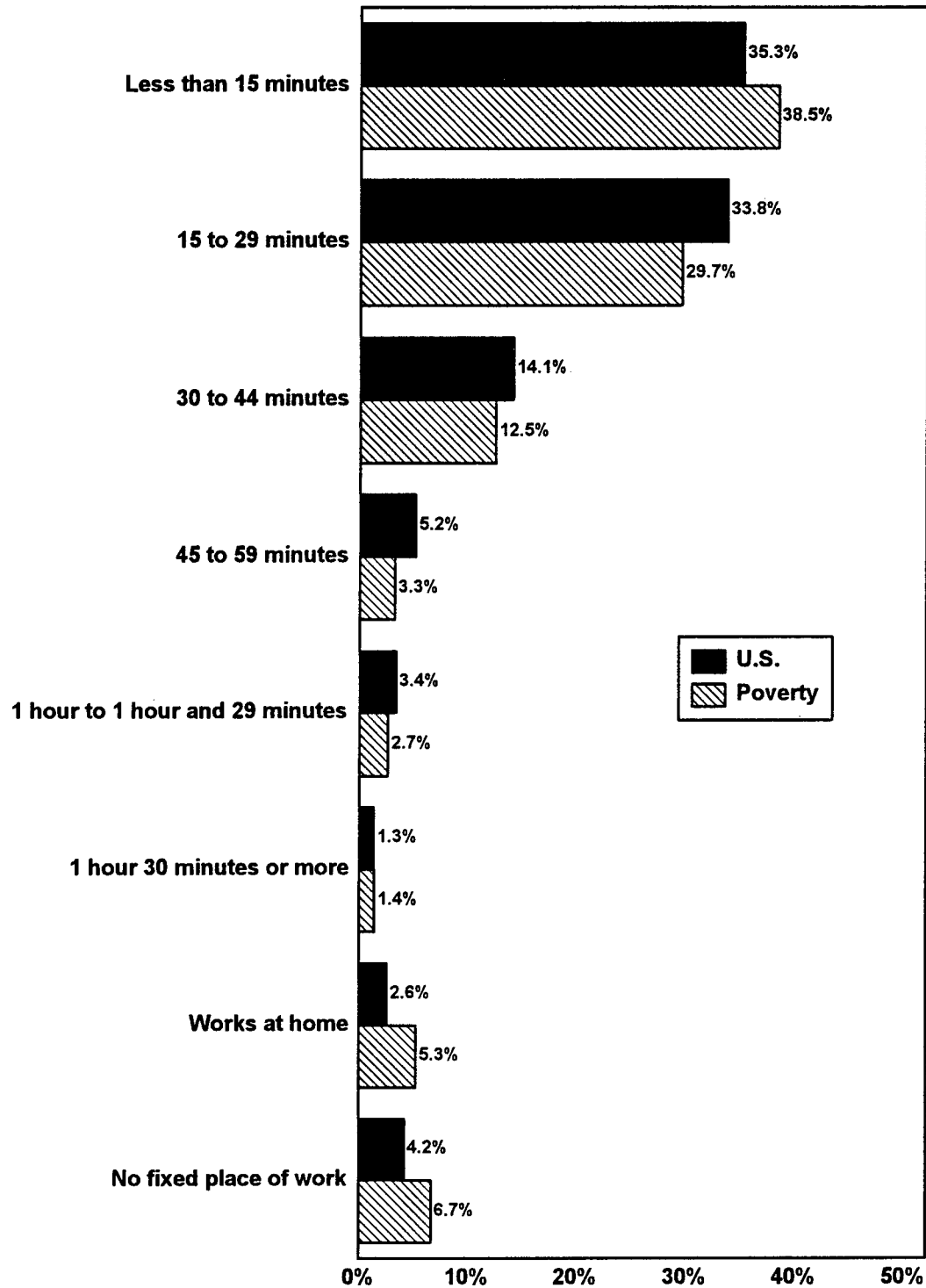


Figure 15
Travel Distance to Work, Commuters Below Poverty Level (1991 AHS)

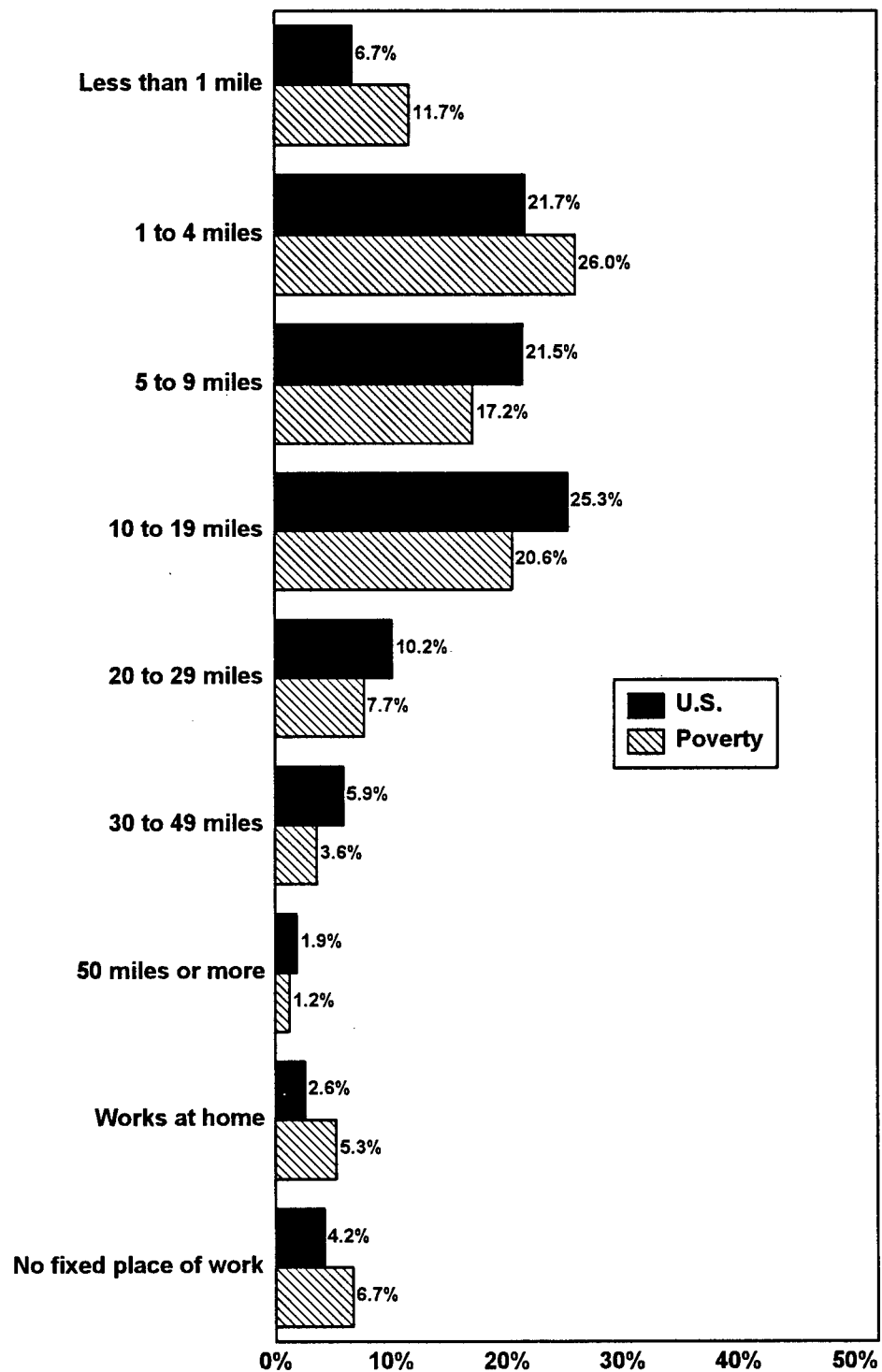


Figure 16
Travel Time to Work by Residential Location (1991 AHS)

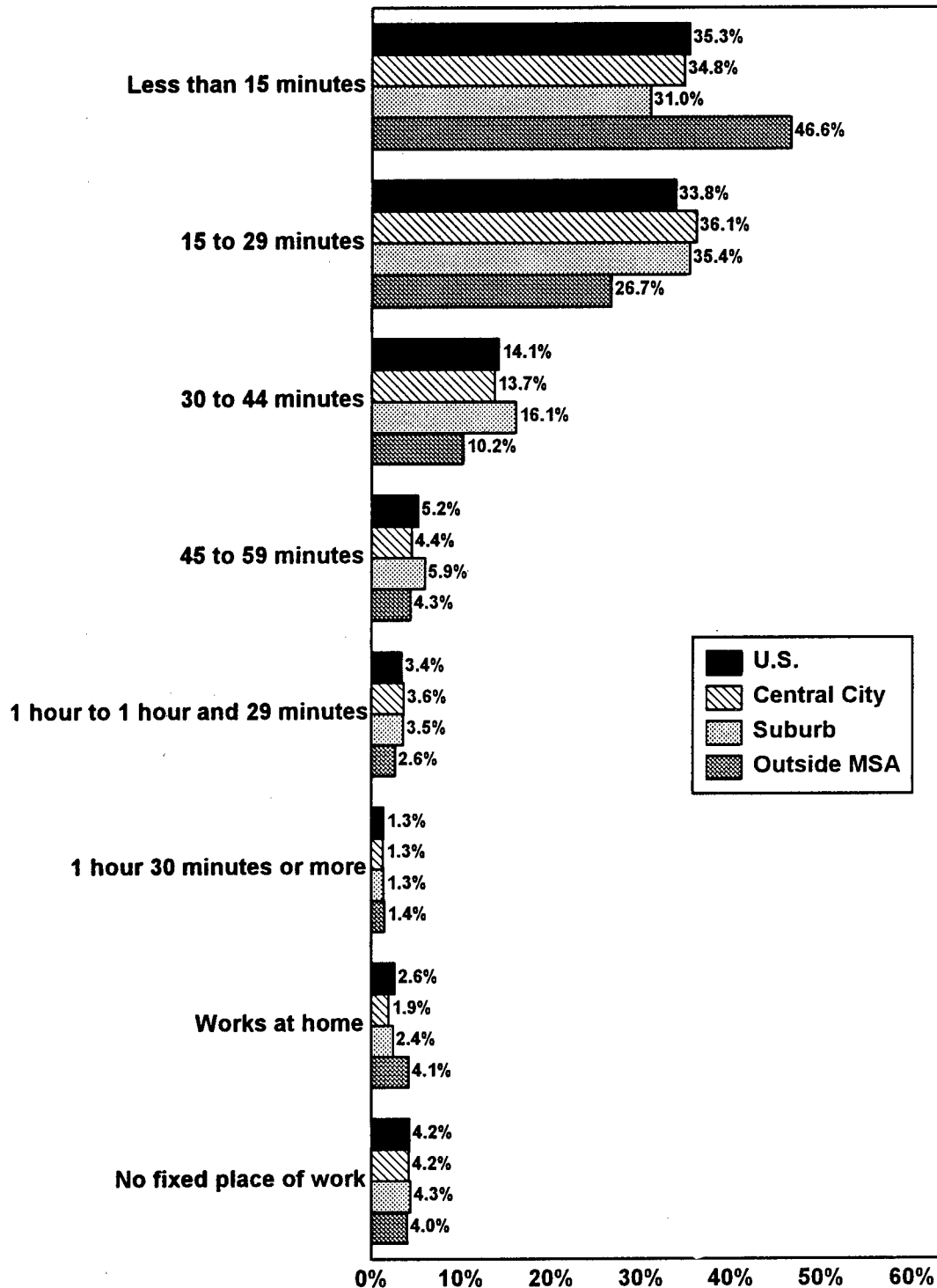
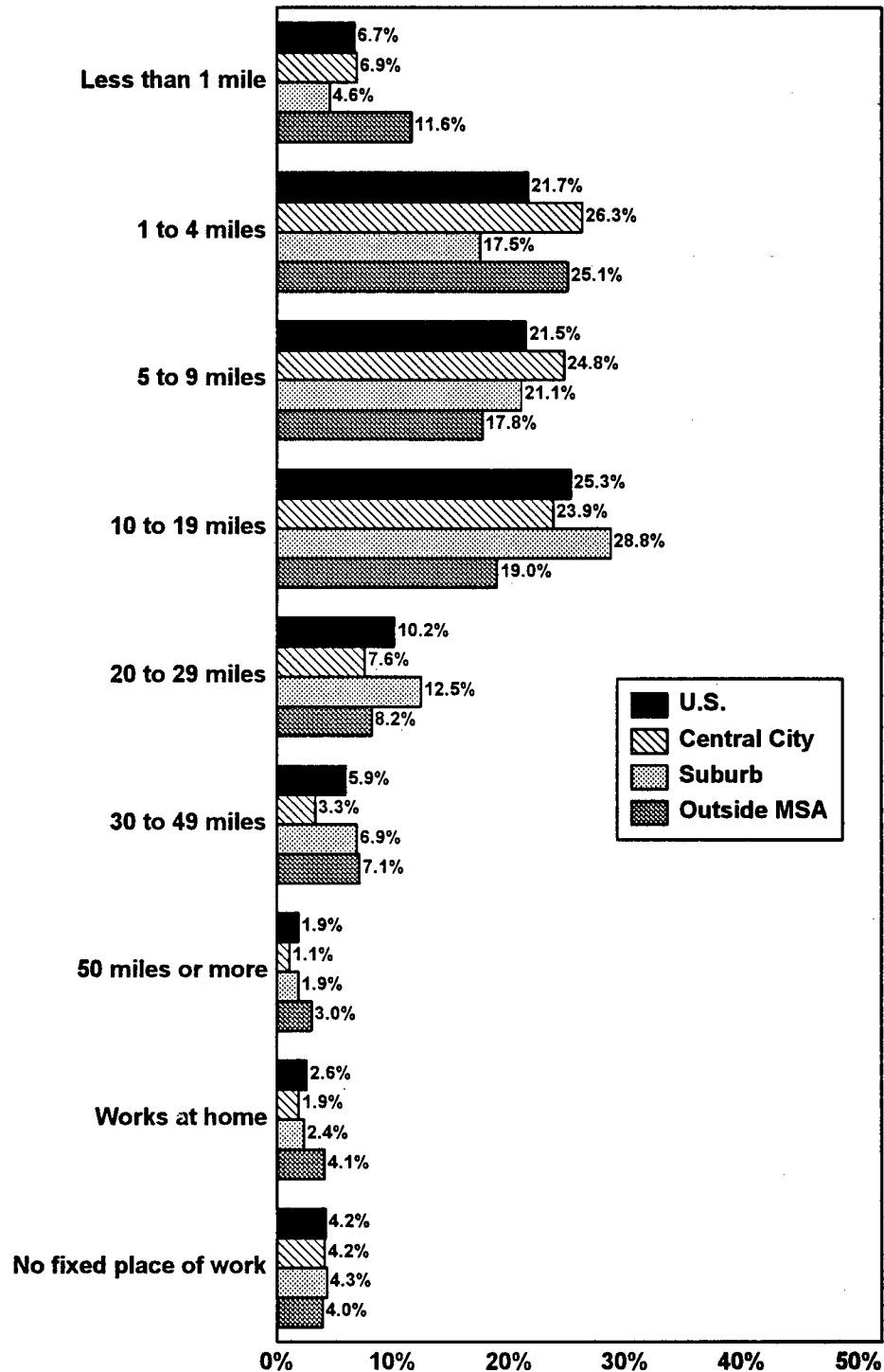


Figure 17
Travel Distance to Work by Residential Location (1991 AHS)





3 PUBLIC TRANSPORTATION

The use of public transportation for the journey to work has declined consistently over the past several decades. According to Census data, the transit share declined from 12.6 percent in 1960 to 5.3 percent in 1990. Even more significant is the fact that the absolute number of commuters using transit also declined from over 7.8 million workers in 1960 to nearly 6.1 million workers in 1990. This occurred despite a 39 percent increase in population and a 78 percent increase in the total number of workers over the same time period.

From a strict policy perspective, it is reasonable to question whether continued investment and support of public transportation is an appropriate and effective use of public funds. This policy question is acknowledged and considered by many in the literature. Development patterns that exist in America today are not conducive to wide-spread transit use. For this reason, it is important to have a clear and thorough understanding of specific market segments that are most inclined to use transit. In particular, the identification of market segments that have a greater than normal probability of using transit for the work trip should be a high priority.

The focus of this section is to present recent trends in the use of public transit for the journey to work as reported in the American Housing Surveys conducted in 1985, 1989, and 1991. Commuting by transit is reported for a variety of geographic, demographic, and housing characteristics. Therefore, the transit mode split can be estimated for numerous market segments. Although much of the data confirms expectations regarding the characteristics of the traditional transit user, the information is useful since it provides recent trends over a shorter period of time than is typically presented using national databases. In addition, the availability of public transportation will be reported, along with the reported satisfaction of transit users in the United States.

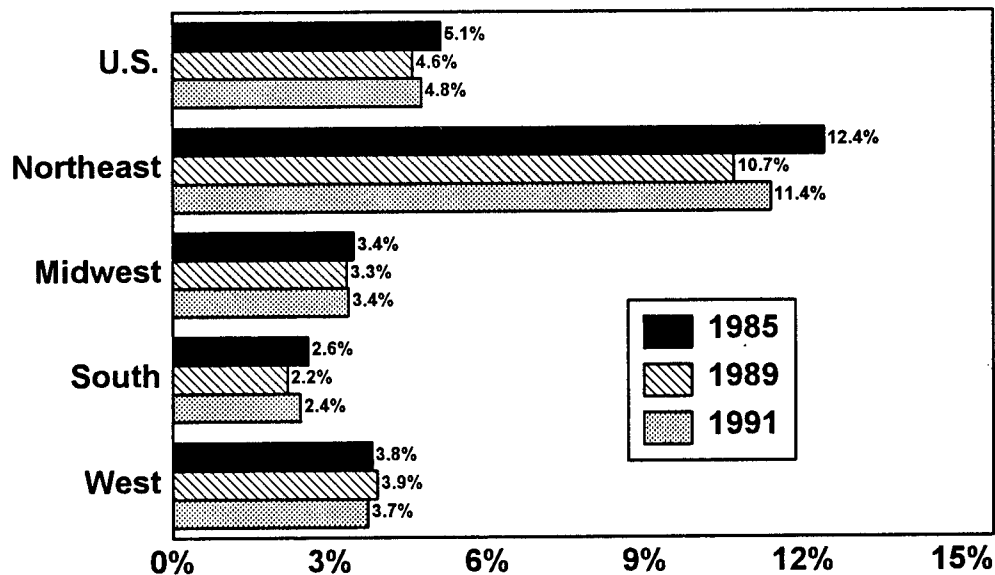
All information presented in this section was derived from the American Housing Survey, Journey-to-Work Supplements. The data are summarized throughout this section with a series of bullets, followed by presentation of the data in a series of graphics.

Transit Share of Journey to Work, United States and Regions



- The transit share for the journey to work in the United States was 5.1 percent in 1985, 4.6 percent in 1989, and 4.8 percent in 1991.
- As expected, the Northeast continued to have the greatest transit share at approximately 11 to 12 percent.
- The other regions had significantly lower transit shares in each year (nearly 4 percent in the West, nearly 3.5 percent in the Midwest, and approximately 2.5 percent in the South).
- There appears to be some indication of increasing transit share in 1991, particularly in the Northeast where the transit share increased from 10.7 percent in 1989 to 11.4 percent in 1991.

Figure 18
Transit Share of Journey to Work by Region
of the United States (1985-1991 AHS)

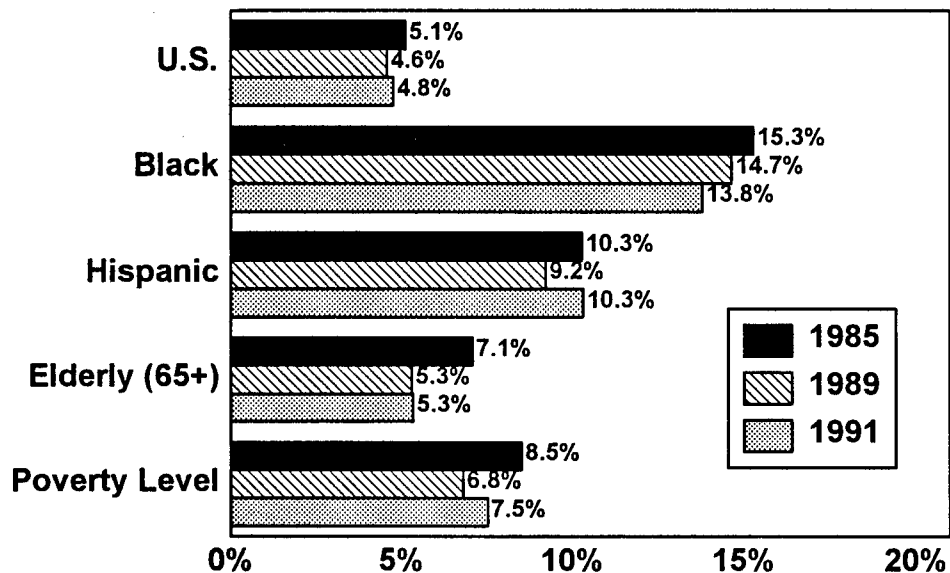


Transit Share of Journey to Work, Selected Demographic Subgroups



- The commute transit shares for Blacks, Hispanics, and the elderly continued to be larger than the national average in each of the years presented.
- The transit share for Blacks remained significant despite declining from 15.3 percent in 1985 to 14.7 percent in 1989, to 13.8 percent in 1991.
- The Hispanic transit share was also significant, falling from 10.3 percent in 1985 to 9.2 percent in 1989, but increasing back to 10.3 percent in 1991.
- Elderly transit use was 7.1 percent in 1985 and 5.3 percent in 1989 and 1991.
- Commuters below poverty level were more likely to use transit with a share of 8.5 percent in 1985, 6.8 percent in 1989, and 7.5 percent in 1991.

Figure 19
Transit Share of Journey to Work for Selected
Demographic Subgroups (1985-1991 AHS)



Transit Share of Journey to Work, Residential Location



- Residential location continued to be an important factor in transit use, with central city residents being more likely to commute by transit than suburban and non-MSA residents.
- The transit share for central city residents was 11.5 percent in 1985 and 10.7 percent in 1989 and 1991.
- Suburban residents are not likely to commute by transit, as their transit share was 3.1 percent in 1985, 2.6 percent in 1989, and 3.0 percent in 1991.
- Those residing outside the MSA virtually never use transit for commuting, as their transit share was less than 1 percent in each of the years.
- Similar observations can be made with respect to urban and rural residential locations. The transit share in urban residential locations was greater than the national average, at 6.7 percent in 1985, 6.1 percent in 1989, and 6.3 percent in 1991.
- The transit share for rural residential locations was less than 1 percent in each of the three years.

Figure 20
Transit Share of Journey to Work
by Residential Location (1985-1991 AHS)

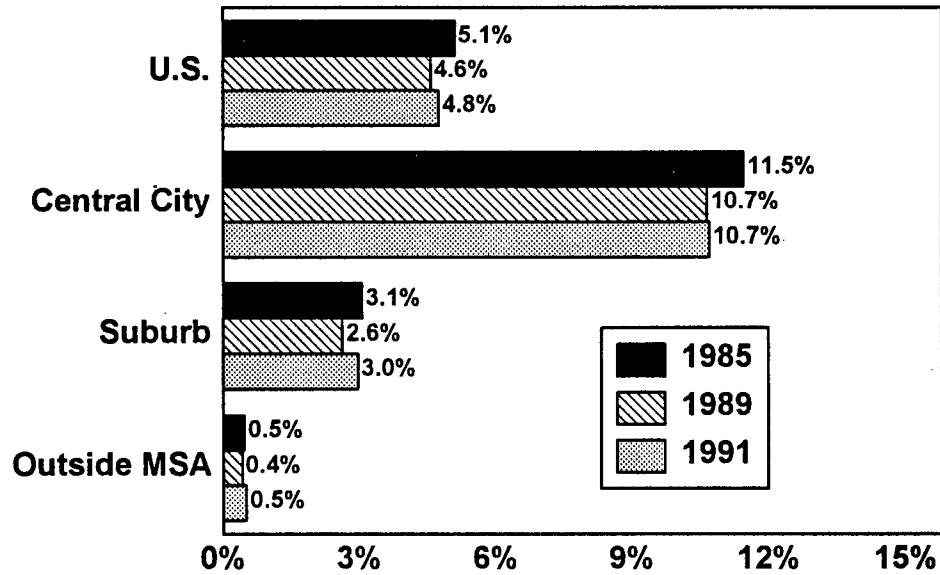
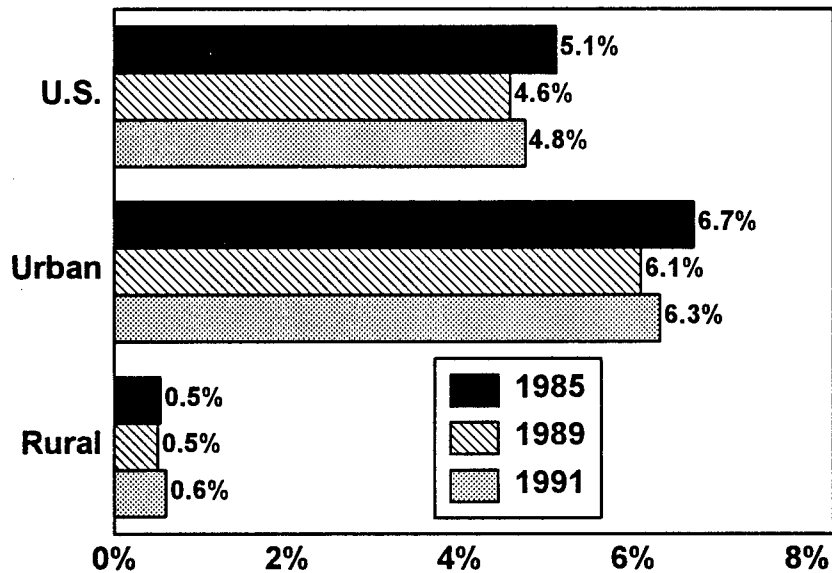


Figure 21
Transit Share of Journey to Work by Residential
Location, Urban vs. Rural (1985-1991 AHS)



Transit Share of Journey to Work, Selected Housing Characteristics



- Those who rent dwelling units were more likely to commute by transit than homeowners.
- The transit share for renters was 9.2 percent in 1985, 8.6 percent in 1989, and 8.9 percent in 1991. In contrast, the share for homeowners was 3.2 percent in 1985, 2.7 percent in 1989, and 2.8 percent in 1991.
- Commuters who have recently moved were more likely to commute by transit while getting settled. The transit share for commuters moving within the past year was 5.3 percent in 1985 and 1989, and 5.8 percent in 1991.
- Commuters living in recently constructed homes (4 years) were not likely to commute by transit, with a share of 1.3 percent in 1985, 2.1 percent in 1989, and 2.0 percent in 1991.
- The transit share for commuters living in mobile homes was less than 1 percent in each of the three years.
- Commuters living in homes with physical problems were more likely to commute by transit. The transit share for commuters living in homes with severe physical problems was 15.9 percent in 1985, 7.7 percent in 1989, and 8.6 percent in 1991. Similarly, the share for commuters living in homes with moderate physical problems was 8.6 percent in 1985, 7.5 percent in 1989, and 6.1 percent in 1991.

Figure 22
Transit Share of Journey to Work,
Home Owner vs. Renter (1985-1991 AHS)

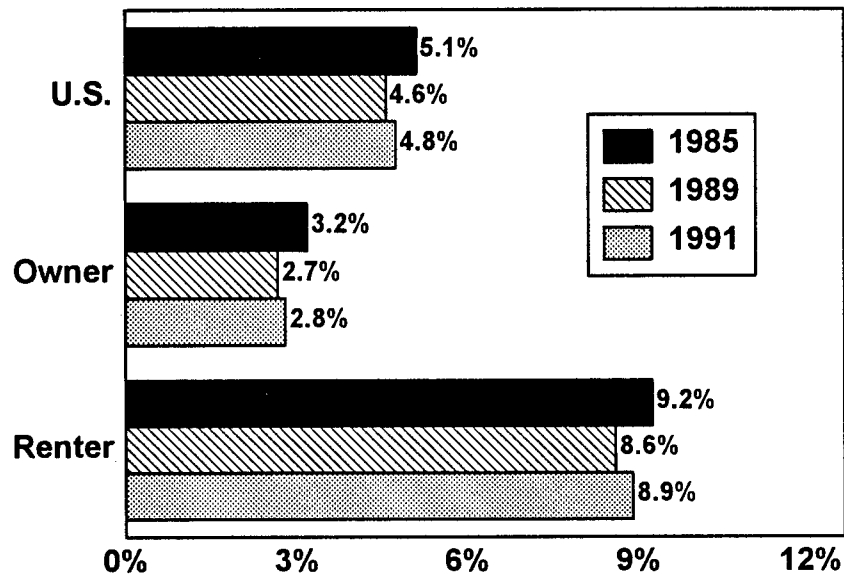
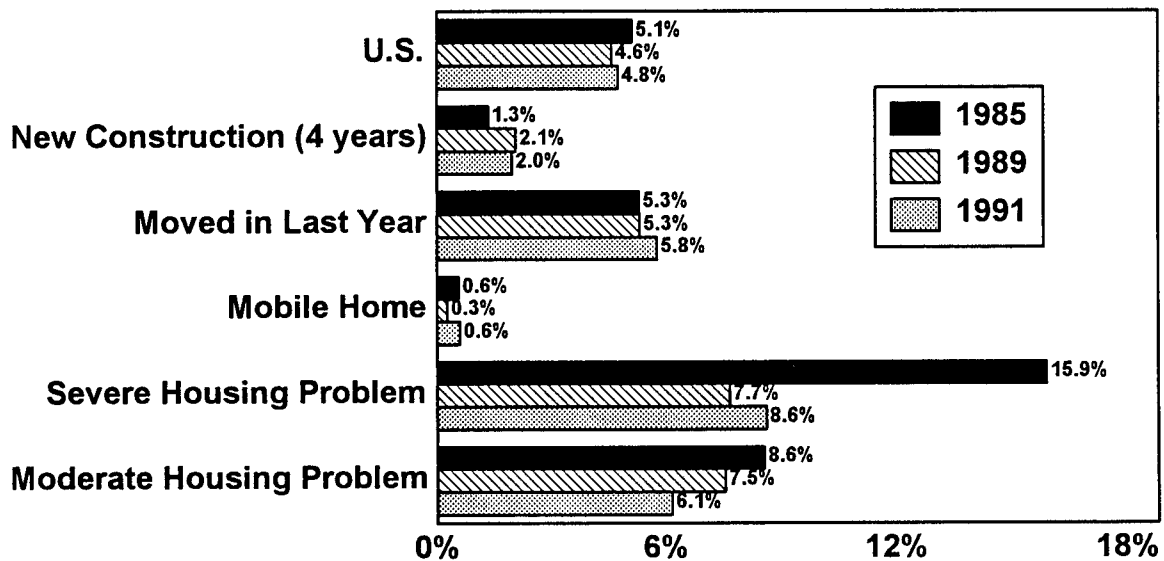


Figure 23
Transit Share of Journey to Work,
Selected Housing Characteristics (1985-1991 AHS)



Public Transportation Availability



- The proportion of the U.S. population reporting the availability of public transportation for all trip purposes was 58.0 percent in 1985, 54.8 percent in 1989, and 54.9 percent in 1991.
- In 1985, 18.4 percent indicated having public transportation available but did not use transit for any trip purpose. This proportion increased to 21.5 percent in 1989 and 21.7 percent in 1991.
- In 1985, 13.4 percent indicated that public transportation was available and that they used it at least weekly for some trip purpose. This same percentage was 11.4 percent in 1989 and 11.7 percent in 1991.

Figure 24
Public Transportation,
Frequency of Use (1985-1991 AHS)

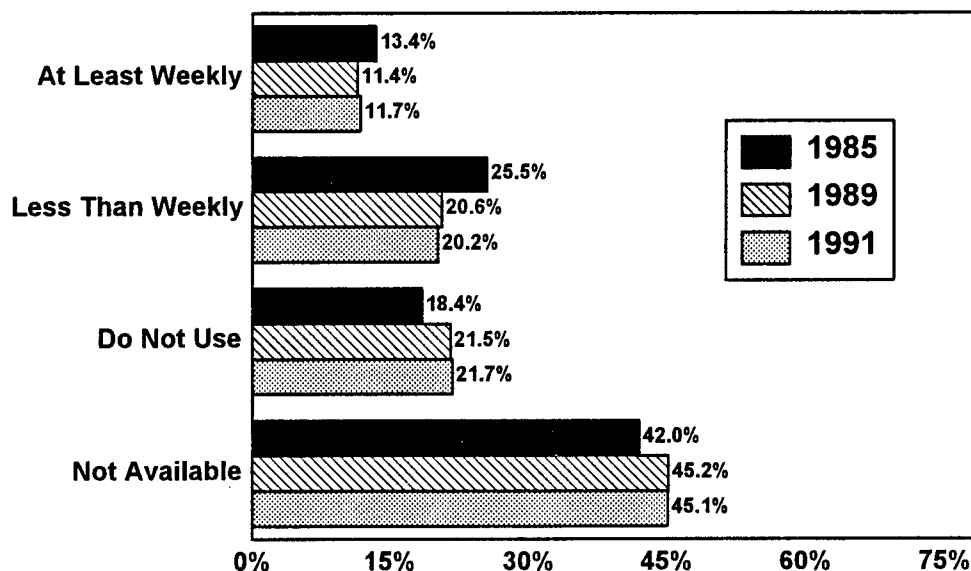


Figure 25
Reported Satisfaction With Public Transportation of
Those Using Transit at Least Weekly (1985-1991 AHS)

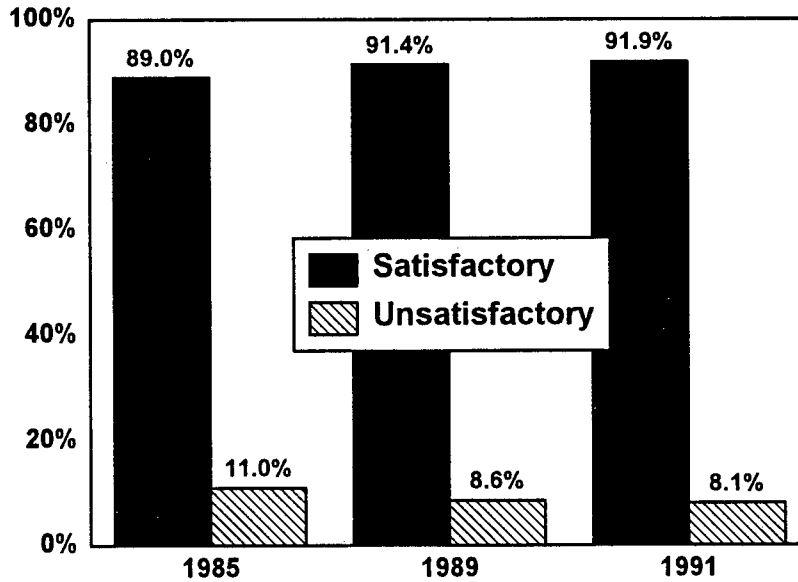
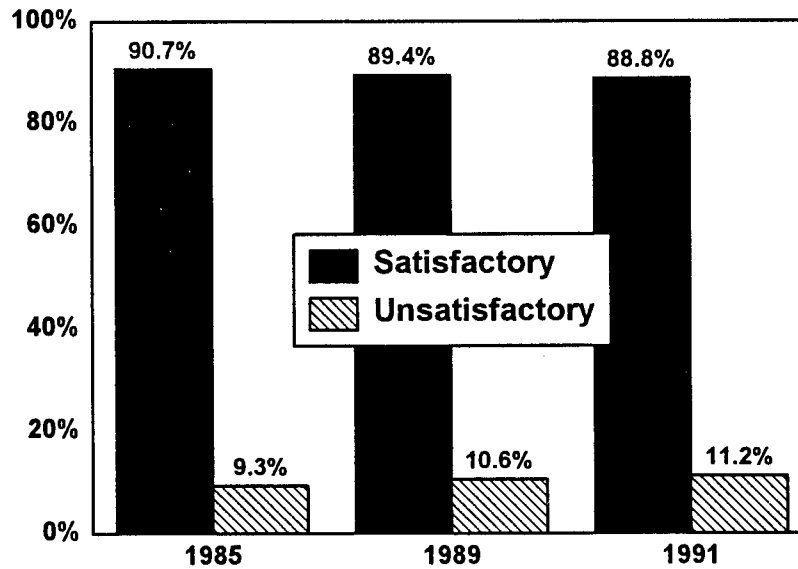


Figure 26
Reported Satisfaction With Public Transportation of
Those Using Transit Less Than Weekly (1985-1991 AHS)





Ridesharing as a mode for commuting to work has declined significantly in the past 10 to 15 years. According to Census data, the carpool share for the journey to work in the U.S. declined from 19.7 percent in 1980 to 13.4 percent in 1990. In addition, the absolute number of workers carpooling fell by 19 percent, from 19.1 million in 1980 to 15.4 million in 1990. Average vehicle occupancy also declined from 1.18 in 1970 to 1.15 in 1980 to 1.09 in 1990. These declines are confirmed by the results of recent national American Housing Surveys, which indicate a decline in carpool share for the work trip from 14.1 percent in 1985 to 11.8 percent in 1989. However, the share increased slightly to 12.0 percent in 1991.

The focus of this section is to present recent trends in the use of ridesharing for the journey to work as reported in the

American Housing Surveys conducted in 1985, 1989, and 1991. Ridesharing to work is reported for a variety of geographic, demographic, and housing characteristics. As a result, the ridesharing mode split can be estimated for numerous market segments. Although much of the data confirms expectations regarding the characteristics of individuals that are most likely to rideshare, the information is useful since it provides recent trends over a shorter period of time than is typically presented using national databases.

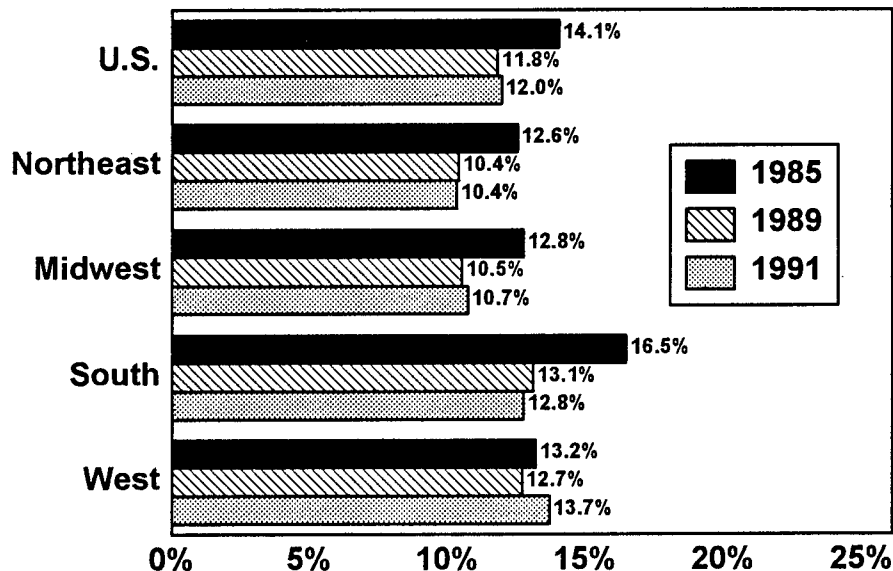
All information presented in this section was derived from the American Housing Survey, Journey-to-Work Supplements. The data are summarized throughout this section with a series of bullets, followed by presentation of the data in a series of graphics.

Carpool Share of Journey to Work, United States and Regions



- The carpool share for the journey to work in the United States was 14.1 percent in 1985, 11.8 percent in 1989, and 12.0 percent in 1991.
- Although the South had the greatest carpool share in 1985 and 1989, the share fell in each year from 16.5 percent in 1985 to 13.1 percent in 1989 to 12.8 percent in 1991.
- The West was the only region that maintained its share over time, from 13.2 percent in 1985 to 12.7 percent in 1989 to 13.7 percent in 1991.
- The carpool share in the Northeast declined from 12.6 percent in 1985 to 10.4 percent in 1989 and maintained this share in 1991.
- Similarly, carpool share in the midwest was 12.8 percent in 1985, 10.5 percent in 1989, and 10.7 percent in 1991.

Figure 27
Carpool Share of Journey to Work by Region
of the United States (1985-1991 AHS)

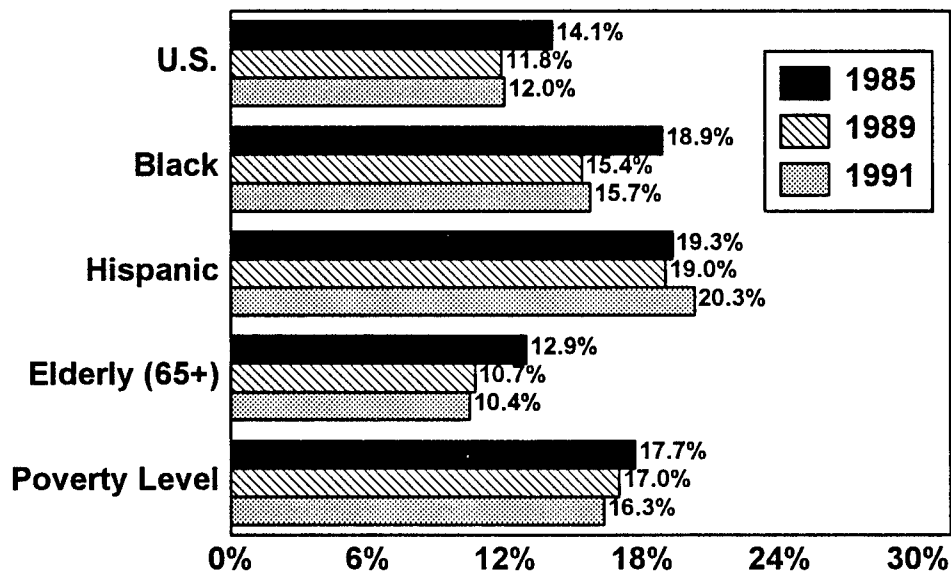


Carpool Share of Journey to Work, Selected Demographic Subgroups



- The carpool shares for Blacks and Hispanics were significantly larger than the national average in each of the years presented.
- In particular, the carpool share for Hispanics was maintained at 19 to 20 percent over this time period.
- The carpool share for Blacks remained significant despite declining from 18.9 percent in 1985 to 15.4 percent in 1989, and increasing slightly to 15.7 percent in 1991.
- The elderly carpool share was consistently lower than the national average (12.9 percent in 1985, 10.7 percent in 1989, and 10.4 percent in 1991).
- Commuters below poverty level were more likely to carpool as the carpool share for this subgroup was 17.7 percent in 1985, 17.0 percent in 1989, and 16.3 percent in 1991.

Figure 28
Carpool Share of Journey to Work for Selected
Demographic Subgroups (1985-1991 AHS)



Carpool Share of Journey to Work, Residential Location



- The carpool share for residents living outside the MSA was 16.1 percent in 1985, 12.7 percent in 1989, and 13.4 percent in 1991.
- Although the carpool share for non-MSA residents declined significantly since 1985, it remained the most significant residential location variable for carpool use.
- The carpool share for central city and suburban residents was approximately the same as the national average, 13 to 14 percent in 1985 and 11 to 12 percent in 1989 and 1991.
- Similar observations can be made with respect to urban and rural residential locations. The carpool share for commuters in rural residential locations was greater than the national average, at 16.3 percent in 1985, 12.7 percent in 1989, and 12.5 percent in 1991. However, it is interesting to note that the rural share is converging and was nearly equal to the national average in 1991.
- The carpool share for commuters in urban residential locations was nearly equal to the national average in each of the years.

Figure 29
Carpool Share of Journey to Work
by Residential Location (1985-1991 AHS)

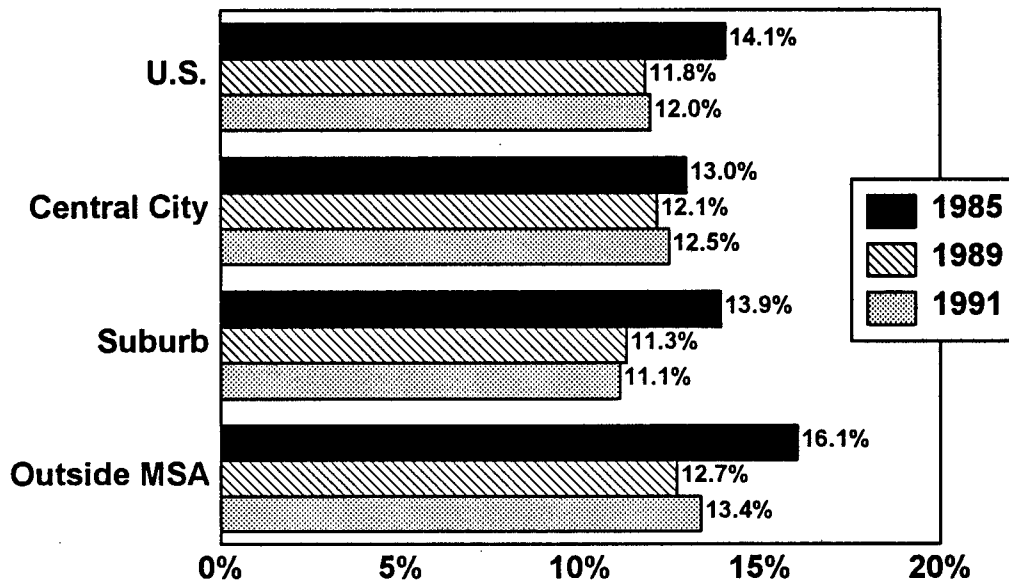
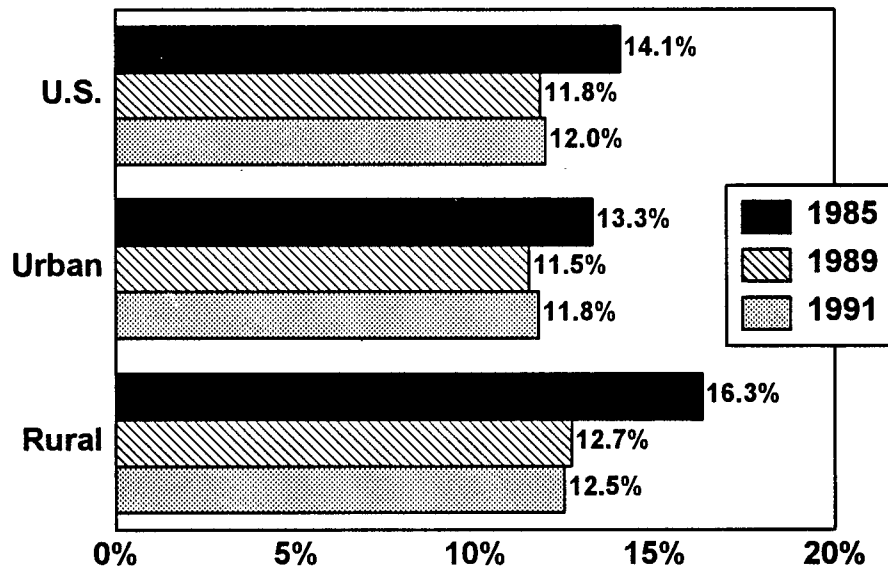


Figure 30
Carpool Share of Journey to Work by Residential
Location, Urban vs. Rural (1985-1991 AHS)



Carpool Share of Journey to Work, Selected Housing Characteristics



- Those who rent dwelling units were more likely to carpool to work than homeowners.
- The carpool share for renters was 14.9 percent in 1985, 13.6 percent in 1989, and 14.6 percent in 1991. In contrast, the share for homeowners was 13.7 percent in 1985, 11.0 percent in 1989, and 10.8 percent in 1991.
- Commuters living in recently constructed homes (4 years) were not as likely to carpool to work, with a share of 15.0 percent in 1985, 10.0 percent in 1989, and 11.5 percent in 1991.
- Commuters who have moved recently (within the past year) were more likely to carpool to work. The carpool share for this subgroup was 15.7 percent in 1985, 13.9 percent in 1989, and 14.7 percent in 1991.
- The carpool share for commuters living in mobile homes was significantly greater than the national average at 19.4 percent in 1985, 16.0 percent in 1989, and 16.4 percent in 1991.
- Commuters living in homes with physical problems were more likely to carpool to work. The carpool share for commuters living in homes with severe physical problems was 22.2 percent in 1985, 13.0 percent in 1989, and 12.7 percent in 1991. Similarly, the share for commuters living in homes with moderate physical problems was 19.7 percent in 1985 and 1989, and 17.2 percent in 1991.

Figure 31
Carpool Share of Journey to Work,
Home Owner vs. Renter (1985-1991 AHS)

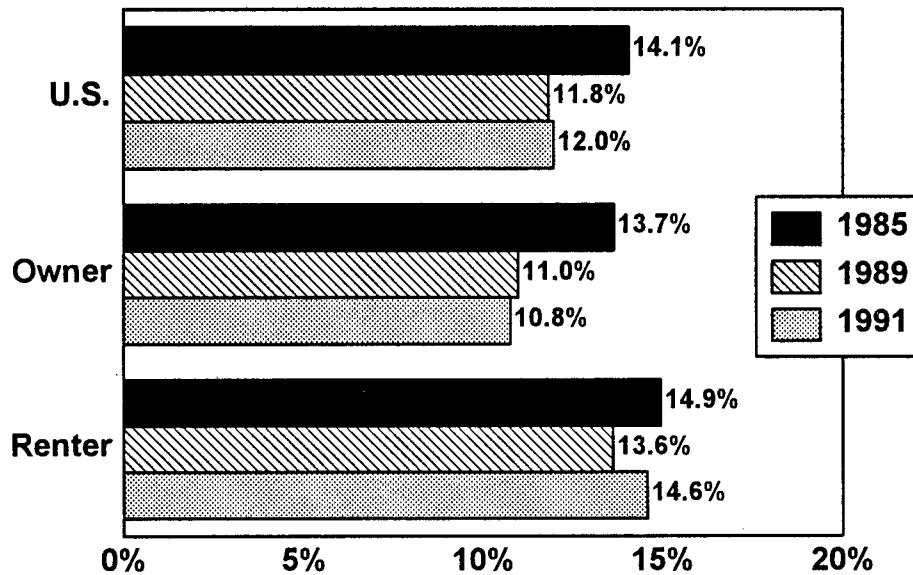
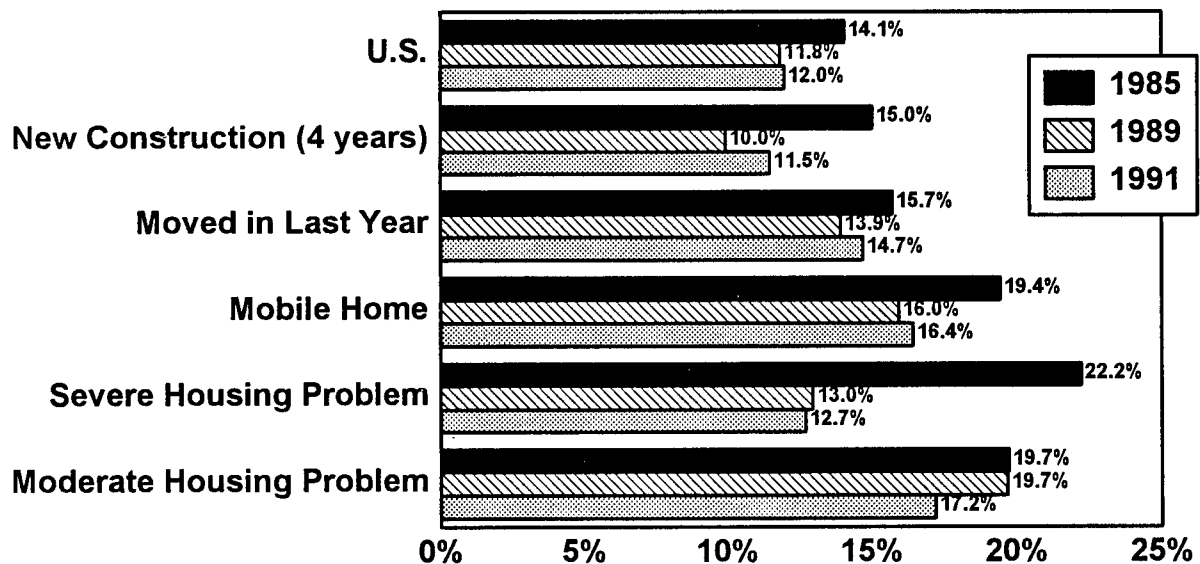


Figure 32
Carpool Share of Journey to Work,
Selected Housing Characteristics (1985-1991 AHS)





5 WORKING AT HOME

In the last decade, working at home as a journey-to-work option has become increasingly popular with U.S. workers. According to U.S. Census data, the number of workers who "worked at home" increased more than 56 percent from 2.2 million in 1980 to 3.4 million in 1990. This increase occurred despite only a 19 percent increase in the total number of workers in the U.S. during this time. As a result, the work at home share of the journey to work in the U.S. increased from 2.3 percent to 3.0 percent between 1980 and 1990.

Comparatively, data from the 1985-1991 American Housing Surveys indicate that the share of U.S. commuters who worked at home declined from 3.0 percent in 1985 to 2.6 percent in 1991. While the reasons for the difference between the results of the two surveys are not evident, it is assumed that definition did not play an important role since both surveys define working at home in broad, generic terms. For example, it can be expected that the 3.4 million commuters who indicated "worked at home" as their primary place of work in the 1990 Census will include persons with manufacturing or service-type jobs, persons who are self-employed, and telecommuters.

Telecommuting, as defined by LINK Resources, a New York-based technology research and consulting firm, involves *company employees working at home part- or full-time during normal business hours*. LINK Resources

conducts an annual National Work-at-Home Survey in which 2,500 randomly selected U.S. households are interviewed via telephone to identify telecommuters. Results of the latest survey, conducted in 1993, found that there are 7.6 million telecommuters in the U.S.¹ This represents a 38 percent increase over the 5.5 million telecommuters that were identified in LINK's 1991 survey.² In addition, the survey data indicated that the share of the U.S. workforce that telecommutes also increased from 4.5 percent in 1991 to 6.1 percent in 1993.

The focus of this section is to present recent trends in working at home as reported in the American Housing Surveys conducted in 1985, 1989, and 1991. Working at home is reported for a variety of geographic, demographic, and housing characteristics. As a result, the work-at-home mode share can be estimated for numerous market segments.

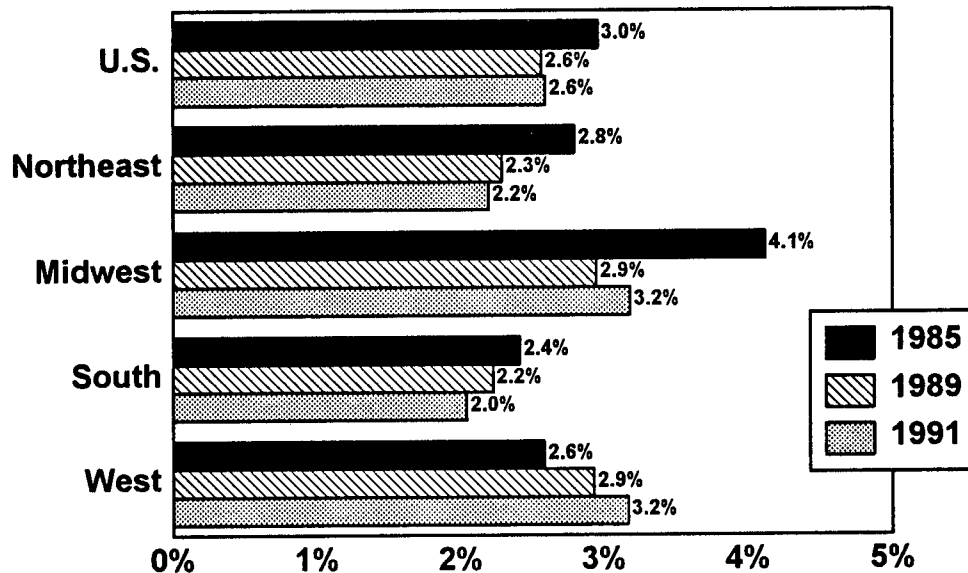
The information is particularly useful since it provides recent trends over a shorter period of time than is typically presented using national databases. All information presented in this section was derived from the American Housing Survey, Journey-to-Work Supplements. The data are summarized throughout this section with a series of bullets, followed by presentation of the data in a series of graphics.

Work-at-Home Share, United States and Regions



- The work-at-home share in the U.S. was 3.0 percent in 1985 and 2.6 percent in 1989 and 1991.
- The West is the only region that has shown consistent growth in the work-at-home share, increasing from 2.6 percent in 1985 to 2.9 percent in 1989 to 3.2 percent in 1991.
- The work-at-home share in the Northeast was 2.8 percent in 1985, 2.3 percent in 1989, and 2.2 percent in 1991.
- Similarly, the work-at-home in the South was 2.4 percent in 1985, 2.2 percent in 1989, and 2.0 percent in 1991.
- The work-at-home share in the Midwest was 4.1 percent in 1985, 2.9 percent in 1989, and 3.2 percent in 1991.

Figure 33
Work-at-Home Share of Journey to Work by Region
of the United States (1985-1991 AHS)

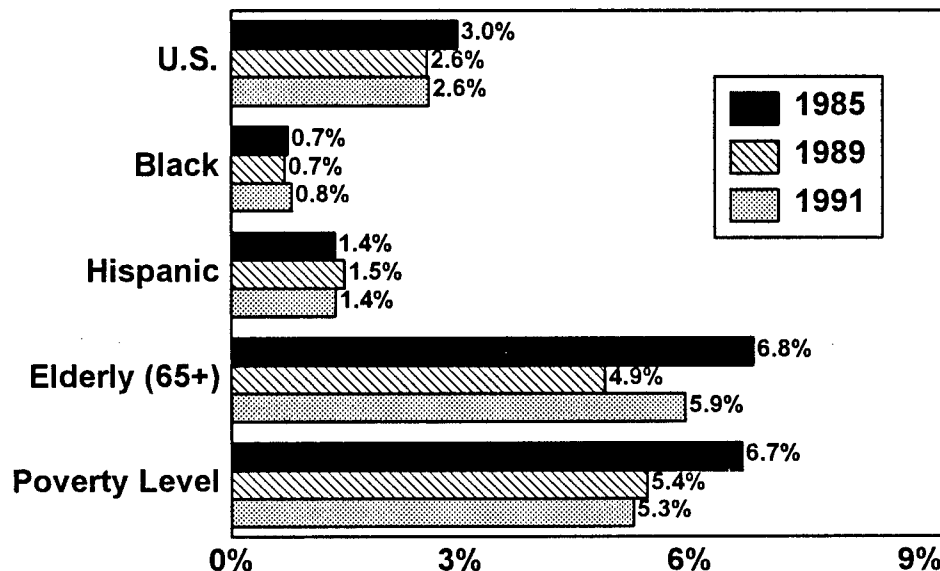


Work-at-Home Share, Selected Demographic Subgroups



- The work-at-home shares for Blacks and Hispanics were much lower than the national average in each of the years presented.
- The work-at-home share for Blacks was less than 1 percent in each of the years.
- The Hispanic work-at-home share was somewhat greater than for blacks but remained minimal at approximately 1.5 percent.
- The work-at-home share for the elderly was greater than the U.S. average, with a share of 6.8 percent in 1985, 4.9 percent in 1989, and 5.9 percent in 1991.
- Commuters below poverty level were more likely to work at home as they had a share of 6.7 percent in 1985, 5.4 percent in 1989, and 5.3 percent in 1991.

Figure 34
Work-at-Home Share of Journey to Work for Selected
Demographic Subgroups (1985-1991 AHS)



Work-at-Home Share, Residential Location



- Residential location was an important factor in determining work-at-home share, as rural residents were more likely to work at home than central city and suburban residents.
- The work-at-home share for rural residents (or outside MSA) was much greater than the national average, at 5.5 percent in 1985, 4.2 percent in 1989, and 4.0 percent in 1991.
- The work-at-home share for central city residents was lower than the national average, with a share of 2.0 percent in 1985, 1.7 percent in 1989, and 1.9 percent in 1991.
- Suburban residents were characterized by a work-at-home share that was nearly equal to the national average, at approximately 2.5 percent in each of the years.

Figure 35
Work-at-Home Share of Journey to Work
by Residential Location (1985-1991 AHS)

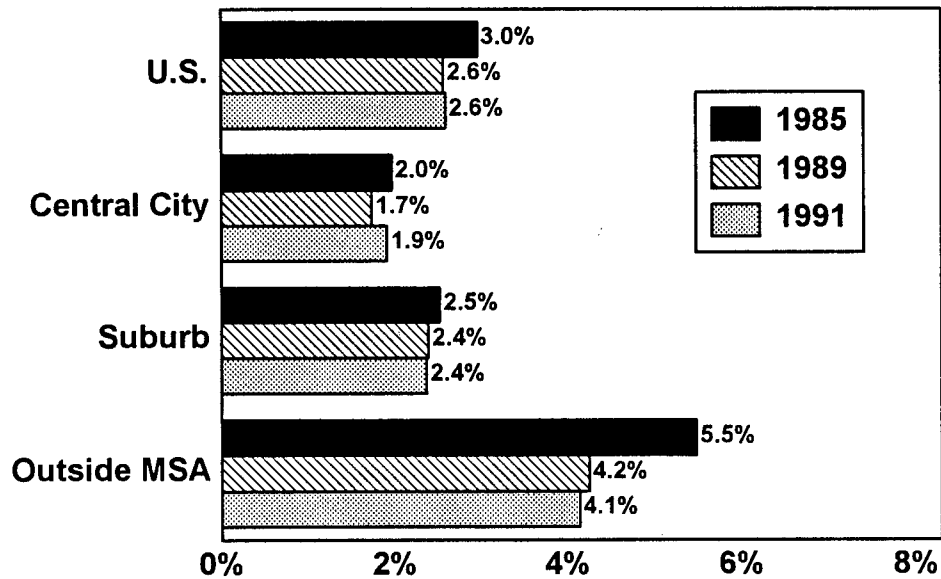
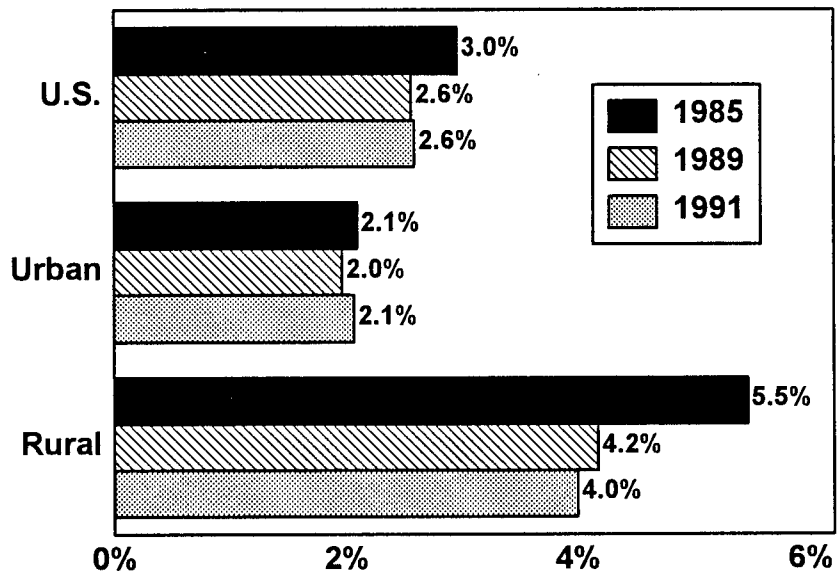


Figure 36
Work-at-Home Share of Journey to Work by Residential
Location, Urban vs. Rural (1985-1991 AHS)



Housing Characteristics

- The work-at-home share for renters was lower than the national average, at 2.2 percent in 1985, 1.9 percent in 1989, and 1.7 percent in 1991.
- In contrast, the work-at-home share for homeowners exceeded the national average in each of the three years, including 3.3 percent in 1985, 2.9 percent in 1989, and 3.0 percent in 1991.
- None of the selected housing characteristics appeared to be significant in resulting in higher work-at-home shares. With one exception (severe physical problems with housing in 1991), each of the housing characteristics resulted in work-at-home shares lower than the national average in 1991.

Figure 37
Work-at-Home Share of Journey to Work,
Home Owner vs. Renter (1985-1991 AHS)

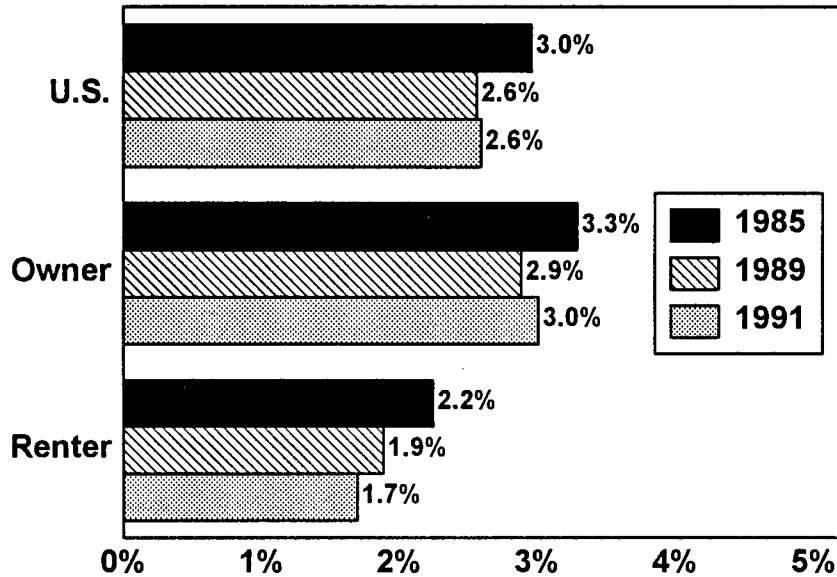
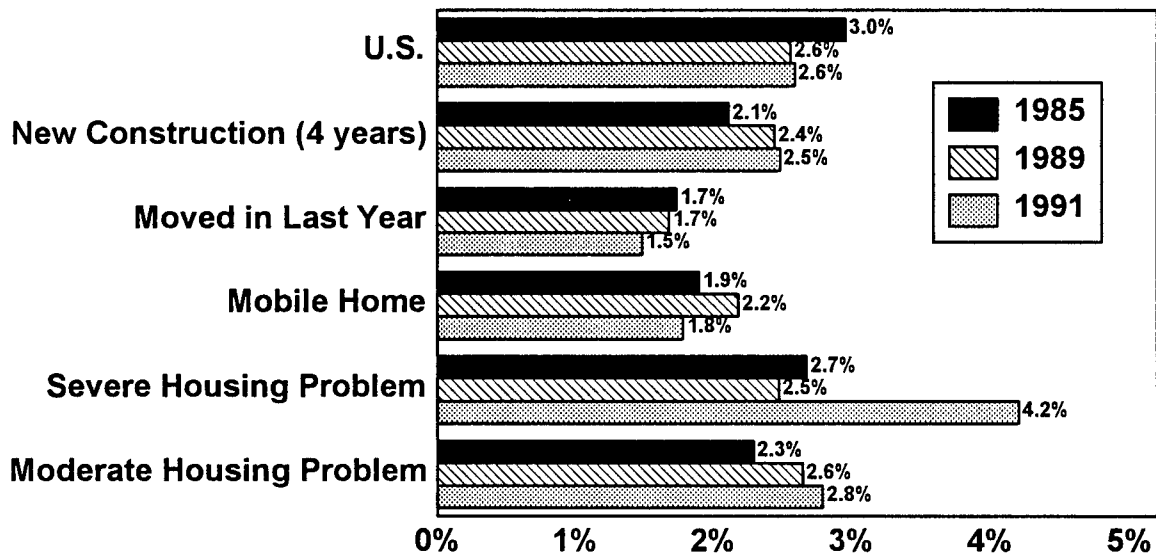


Figure 38
Work-at-Home Share of Journey to Work,
Selected Housing Characteristics (1985-1991 AHS)





6 THE FUTURE OF COMMUTING ALTERNATIVES

The future of commuting alternatives in the United States is discussed in this section. Based on recent trends and a review of the literature, opinions are offered regarding the future of commuting for the more than 115 million workers in the United States.

PUBLIC TRANSPORTATION

Over the past few decades, the public transit industry in the U.S. continuously has made efforts to provide quality services in extremely challenging environments. The range of efforts has been broad, including institutional and organizational modifications, technological and hardware changes, and service delivery and marketing innovations. In spite of these changes, the industry has had limited success in its efforts to adapt to the challenges of transit markets that have been impacted by demographic, geographic, economic, technological, and societal trends. As a result, the industry has experienced continued declines in market share, ongoing financial struggles, and continuing challenges in attempting to meet the needs of changing markets.

Finding funding sources for transit continues to occupy industry attention, but many other agenda items have developed over the past decade. Multimodal/intermodal planning and implementation are receiving a great deal of attention. Transit captives continue to be the dominant share of riders in most markets; the mobility needs of the elderly are growing; safety, public participation, service quality, and alternative fuels are among the issues receiving more attention; route structures still focus most prominently on the downtowns, but downtowns comprise ever more modest shares of urban employment. Articulated and small buses are increasingly common.

Development patterns, public sector resource constraints, lifestyle changes, and the increasing affordability of automobile travel all have contributed toward greater reliance on privately-owned vehicle alternatives. The most successful transit services have been those provided in traditionally strong markets, such as concentrations of transit dependents in large and more densely populated urban areas. However, in some instances, transit has experienced success in areas where the transit choice

has become more attractive due to certain conditions, such as high automobile parking costs, high density development patterns, or high quality transit services that are competitive with auto travel.

Transit agencies have pursued numerous strategies in their efforts to adapt to a rapidly changing operating environment. Some of the more common strategies have included:

- Expand service in the suburbs.
- Adopt institutional and organizational change.
- Invest in fixed guideway systems.
- Incorporate technological change.
- Participate in the local site design review process.
- Implement transportation demand management strategies.
- Adopt innovative marketing techniques and total quality management.

Each of these strategies has resulted in varying degrees of success. In several cases, resource constraints and time lags may not have allowed responses to these changes to be fully reflected in the market. However, as discussed previously, recent AHS data suggest an underlying trend that the transit share for U.S. workers and for many subgroups is perhaps stabilizing and, in some cases, increasing. Despite this positive sign, the transit industry continues to face significant challenges and must adapt continuously to survive in today's society.

Understanding existing and future operating environments and transit markets will be of critical importance if transit systems are to maintain or increase transit mode share in the future and will enhance the development and implementation of service concepts appropriate to meet the needs of existing and future transit riders. In addition, the success of transit systems in achieving their traditional societal objectives, i.e., enhanced mobility, reduced congestion, improved air quality, etc., is dependent upon the ability of the transit industry to adapt and respond to the changing environments and markets.

The remainder of this discussion provides a summary of some of the recent assessments of the future of public transportation through the eyes of the American Public Transit Association (APTA) and the American Association of State Highway and Transportation Officials (AASHTO). This is followed by a review of recent literature on transit management and service strategies for the coming decades. The section concludes with four recommendations for the transit industry that were developed based on general agreement in the literature.

Recent National Studies on the Future of Public Transportation

APTA's Transit 2000

APTA conducted a study to identify and examine trends that are affecting the future of transit and recommended specific action items that could contribute to a more favorable future environment in which to operate. The study identifies five major forces that are likely to affect transit in the 21st century:³

- congestion and auto dominance
- threats to the environment
- threats to energy independence
- inadequate infrastructure investment
- demographic change

With these forces in mind, the report concludes that transit can play an important role in helping to deal with these issues in the context of the future of transportation as a whole. A series of goals are identified to help guide transit systems in the coming decades and are presented in Table 3.

Future Directions (AASHTO)

A Study on Future Directions of Public Transportation in the United States was published by AASHTO in 1985.⁴ The study was designed to identify the important role that state transportation agencies could play in supporting public transportation. The report states the belief that public transportation is "not a single mode, but a mixture

Table 3
Transit Industry Goals for the Future

Goal 1	Preserve, protect, and expand current markets and choices available to current public transportation users.
Goal 2	Pursue new markets, increased ridership, and expanded market share by both traditional and innovative means.
Goal 3	Seek increased investment in public transportation at all levels.
Goal 4	Assume new responsibilities and forge new relationships in both the management of mobility as well as in the provision of public transportation services.
Goal 5	Foster and participate in land-use planning actions that more effectively integrate economic development and infrastructure investment decisions to enhance the use of public transportation in its many forms.
Goal 6	Enhance public awareness and acceptance of the need for greater investment and new partnerships in preserving and enhancing mobility for all.

Source: As summarized in Michael D. Meyer, "Public Transportation in the 21st Century," *Public Transportation*, p. 639.

of modes (transit, ridesharing, and paratransit) each complementing the other and interacting to form a system for passenger mobility and a cost-effective group of services." One future scenario was envisioned where the development of the transit industry would likely continue and would incorporate the following characteristics:

Demographic and land use changes will present new problems and opportunities for the industry....

Less federal funding would create problems for some transit systems. More stable funding sources will be needed with state and local governments, but it is unlikely that funds will be in adequate supply.

Transit managers will experience less political interference and have greater flexibility to run their systems. Part of the reason for this change will be increased involvement by the private sector.

Cost consciousness will be a key aspect of all transit system operations. Failure to control costs will lead to bankruptcy and the demise of various systems.

Professionalism will take on new meaning in the industry as managers and governing boards recognize that survival, and expansion, are functions of better professional performance....

Moderate gains in technology will be of value to the transit industry. Such gains are not likely to be spectacular breakthroughs, but more likely system innovations that develop over time.

Increased industry involvement by all participants, leading to increased political involvement, seems likely to occur....

The conclusion of the report provides recommendations to various groups that would necessarily be involved in the future of public transportation, including the federal government, state governments, local governments, public transit operators, labor, private operators, the business community, transit users, and industry associations.

Transportation 2020 (AASHTO)

Transportation 2020 was a national effort to discuss and recommend a framework for future transportation pro-

grams.⁵ All aspects of a national transportation program were considered, including future considerations for public transportation. Three specific areas were emphasized in their discussions of transit, including:

- *Future Technological Innovations* - Major technological advances anticipated within each form of public transportation were identified and discussed.
- *Institutional Structures* - Four major factors were identified that could have significant influence on institutional structures, including the impact of budget deficits on transit funding programs, the impact of demands on the provision of transit service, the impact of private sector participation, and the impact of federal labor protection rules on the costs of providing service.
- *Financial Needs* - Considerable attention was given to the financial needs of the industry and three major funding scenarios were used to estimate the capital costs of achieving different policy objectives.

These national studies provide recommendations for the transit industry from a more global perspective. With these issues in mind, it is appropriate to initiate discussion of more system-specific strategies, including those specifically related to management techniques and services.

Strategies for the Coming Decade

Recent literature offers several approaches to the development of transit management and service strategies in the coming decades. A discussion of management and service strategies is provided below.

Management Strategies

Perkinson discussed a transit strategy for the 1990s by comparing two distinctly different views of transit—infrastructure vs. service.⁶ The traditional view suggests that transit is one component of infrastructure—the system of utilities and services that supports our every day existence. Characteristic of an infrastructure organization is a conservative management strategy of status quo and a traditional hierarchical organizational structure with rela-

tively autonomous departments and discrete responsibilities. In contrast, a transit system also can be viewed as a service organization, designed to be proactive and customer oriented. Perkinson points out that this view is nontraditional in the transit industry. A service-oriented transit system can anticipate user needs and future demand for currently provided services as well as services that have not yet been implemented.

This management strategy has distinct organizational implications. It may require decisionmaking assistance from individuals at the lower end of the hierarchy—those who are closer to and have a better understanding of the customer. In addition, a service organization necessitates coordination and communication among departments. Marketing and planning departments must work closely to develop an understanding of existing and future transit markets and then to determine the best way to respond to these markets. A transformation from the traditional infrastructure organization to a service organization is the fundamental change that will enable transit to adapt and survive in the future.

Barker recommends a management strategy for the 1990s in response to a series of key trends that he believes will affect the future of the transit industry.⁷ He discussed key trends in the following areas:

- energy and environmental concerns
- land development and urban growth not conducive to transit use
- demographic trends (senior boom, birth dearth, aging of the baby boom)
- diverse workforce
- need for more education for the workforce
- social ills (crime, violence, etc.)
- computers and communications technology
- economics and the automobile industry

In response to these key trends, Barker recommends the following strategy for transit management in the 1990s:

- Upgrade Maintenance and Storage Capability - Plan for projected changes in fuels and engines

over the next couple of decades by making sure adequate space is available.

- Learn to Manage a Diverse Workforce - Understanding employees will enable you to get the most from them.
- Invest in People - Create a working environment that attracts and retains the best people.
- Plan to Change Compensation Programs - Move toward compensation based on performance and productivity.
- Organize into Entrepreneurial Teams - Organize employee groups to develop and implement improvements.
- Buy/Sell More Non-Transportation Services - Become more involved in buying and selling non-transportation services, such as maintenance, training, parts storage, etc.
- Leapfrog in Technology - Think about and plan for technology that can make a big difference in the way you do business.
- Get on the Anti-Crime Team - Involve the transit system in a community watch program to make visible efforts toward safety improvements.
- Get Involved with the Site Design Review Process - Review site designs in an effort to ensure that they are pedestrian and transit friendly.
- Market to the "Sharper Image" Generation - Implement safe, comfortable, and convenient services for which a premium fare can be charged.

Many general managers in the transit industry today appear to support the ideas discussed previously. For example, recent comments that seem to reflect the general sentiment of many of today's transit industry leaders and their new and evolving perspectives on transit include the following:

"I believe the answer lies in reshaping our traditional view of transit, a view which does not extend beyond running trains and buses. In order to attract new riders, I believe we have to shift our focus from operating vehicles to serving customers. A sound

customer service program which responds to the needs of the riding public can attract more riders while retaining existing ridership."

-Kenneth M. Gregor,
General Manager,
Metropolitan Atlanta Rapid Transit Authority
(*Bus Ride*, May 1992)

"Too many people think transit is a dead-end industry with no new ideas. We must show how wrong that thinking is because it may be the only way to gain entry into the vast travel market of people who wouldn't even think of using our services. We now have opportunities to show a different, progressive face. The pop culture may have the right idea: JUST DO IT!"

-John P. Bartosiewicz,
General Manager,
Fort Worth Transportation Authority
(*Bus Ride*, May 1992)

Service Strategies

The transit industry has realized that fixed-route bus service is not the appropriate service delivery option for many of the evolving markets in our society. This was expressed in a recent article by Padron, where he recommends appropriate service strategies in response to changing demographics and development patterns.⁸ His main point is that it makes little sense to continue expanding fixed-route service in suburban areas. This traditional approach is expensive and largely unproductive. He indicates that transit systems would be better off avoiding this travel market and focusing their efforts on:

- *Growth in the traditional suburb-to-central city journey to work* - Despite suburb-to-suburb travel becoming the predominant national commuting pattern, growth in traditional suburb-to-central city commuting has been substantial.
- *Work travel between metropolitan areas* - As suburbs continue to expand and overlap, commuting between metropolitan areas will become a significant component of commuting patterns.
- *The transportation needs of the central city.*

Although reluctant to offer any service strategy for the suburbs, Padron indicates that the only realistic alternative for serving a suburban environment is paratransit. Although the use of paratransit will not provide the definitive answer to all transportation problems in the suburbs, paratransit can serve an important role in the suburban operating environment, particularly since this market remains largely untapped.

Meyer cites six major recommended structural changes for transit that he believes will be necessary for future success. These recommended changes are provided in Table 4. Without these fundamental changes, it is believed that the future of the industry will be characterized by gradual economic attrition.⁹

Conclusions

Four major recommendations were identified as being important for the future success of public transportation based on review of the APTA and AASHTO studies, along with other literature discussing the future of public transportation. These recommendations are presented below.

1. Incorporate New Management Strategies

The transit system of the future cannot continue to operate based on the traditional view of the transit organization. In order to achieve success, transit systems must foster a working environment that can quickly and easily adapt to the needs of its users. Perkinson refers to it as a service organization in contrast to the more traditional infrastructure organization. Barker emphasizes the importance of involving employees at all levels in the decisionmaking process. Meyer's recommendations include the need for a sales-oriented organizational structure. This approach to management in the transportation industry is often referred to as mobility management, where transit systems find ways to transport patrons by whatever means is most convenient and cost effective.

2. Focus on Traditional Transit Markets

The transit industry should focus the majority of its efforts on markets and services that they have traditionally served well. Service for the traditional suburb-to-central city

Table 4
Recommended Structural Changes in Transit

A new fare structure	One that is differentiated by time of day and distance traveled.
Greater discretion to price in relation to cost	Achievable if a surtax is imposed on all-day service parking.
A new sales-oriented organizational structure	One that is decentralized so that planning, routing, and scheduling decisions can be based on an intimate knowledge of the market for locally customized services.
A different fleet mix	One with the capacity necessary to serve the peak but better suited for shuttle, charter, and taxi-like operations in the off-peak.
A wider diversity of service offerings	Some sold on a contract or subscription basis, some purchased from private vendors.
A new contract with labor	One that permits wider use of part-time and cross-trained employees while creating a wider range of promotion opportunities for transit workers.

Source: As summarized in Michael D. Meyer, "Public Transportation in the 21st Century," *Public Transportation*, p. 639.

journey to work and circulation within the central city has been the "bread and butter" for most transit systems in the past several decades. Despite suburb-to-suburb travel becoming the predominant commute flow pattern, growth in the traditional suburb-to-central city commute flow has been substantial. Efforts to serve suburb-to-suburb travel with fixed-route public transportation service are extremely expensive and have proven to be largely unproductive.

3. Anticipate Future Market Opportunities for Specialized Services

Although the focus should be on traditional transit markets, transit systems should anticipate future market opportunities for specialized services. Niche markets will be the key to the industry's future beyond traditional service. Examples of service concepts and market segments that may be appropriate in the future include:

- neighborhood transit services
- jitney services
- expanded paratransit
- fare strategies and payment methods targeted toward specific markets

- employer partnerships
- privatization and brokerage
- smaller vehicles
- transportation demand management strategies
- reverse commute services
- intermodal feeder/distributor services
- time transfer/pulse services

An important research project for the transit industry is about to begin as part of the Transit Cooperative Research Program. *Transit Markets of the Future--The Challenge of Change* (Research Project H-4B) is expected to result in a detailed characterization of existing and future transit markets and recommended service and product concepts that will best serve these markets.

4. Strategically Incorporate Technological Innovation

Technological factors will play a significant role in travel decisions in the coming decades and could potentially contribute to changes in the performance of transit ser-

vices relative to other modes, including factors related to the following performance areas and impacts:

- technology-driven changes in comparative costs
- safety
- comfort/convenience
- energy and air quality impacts
- fare payment methods
- ease of use (ITS/APTS impacts)
- reliability

However, the most important factor in the incorporation of technological innovation into daily transit operations was identified by Barker, who indicated that the first step in implementing a technological innovation is the consideration of the people. Are the right employees available to implement the technology? Will employees perceive a benefit from the technology such that they will support its implementation? New technology does not necessarily result in better service. The employees who control the technology must ensure that it is used properly so that potential benefits can be achieved.¹⁰

RIDESHARING

Similar to commuting to work by public transportation, there has been a significant decline in the commute mode share for ridesharing in the past 10 to 15 years. According to Census data, the carpool share for the journey to work in the U.S. declined from 19.7 percent in 1980 to 13.4 percent in 1990. In addition, the absolute number of workers carpooling declined by 19 percent, from 19.1 million in 1980 to 15.4 million in 1990.¹¹ Average vehicle occupancy for the journey to work declined from 1.18 in 1970 to 1.15 in 1980 to 1.09 in 1990.¹²

This decline is confirmed by the AHS data presented earlier, which indicated a decline in carpool share from 14.1 percent in 1985 to 11.8 percent in 1989. However, the share increased slightly to 12.0 percent in 1991. The major advantage of using journey-to-work data from the AHS is that it is collected every other year in odd numbered years.¹³ As a result, national and regional trends can be compiled and analyzed more frequently, while providing

more data points over a shorter period of time. In reviewing the trends in carpooling presented in Section 4, an underlying theme appears to emerge. A relatively significant decline in carpool share is observed from 1985 to 1989, but this trend appears to be stabilizing and perhaps even reversing based on 1991 data. This theme is observed for nearly every subgroup for which the carpool share is measured.

Ferguson (1994) concludes that, after controlling for average retail gasoline prices, the general trend in the carpool share for the journey to work has been steadily downward since 1970. A model was developed to estimate the annual carpool share from 1970 to 1990, a summary of which is presented in Figure 39. The results appear to be relatively consistent with data points established from the Census, NPTS, and AHS surveys.¹⁴ In particular, it is important to note the stabilization that appears to have occurred since 1986.

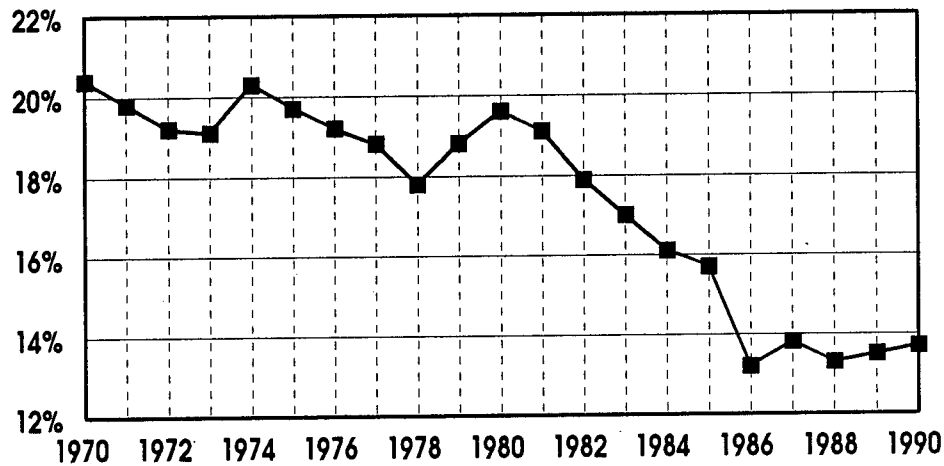
What Caused the Decline?

Three major factors have played a role in the significant decline in carpool share over the past two decades, as well as the subsequent stabilization of the share in recent years, as summarized below.

Household Composition - The number of persons per household has declined consistently in the United States, from 2.75 in 1980 to 2.63 in 1990. Despite this decline, the number of workers per household increased slightly from 1.20 to 1.25 over this same time period. In addition, the availability of the auto increased significantly as the number of vehicles per household increased from 1.61 in 1980 to 1.67 in 1990.¹⁵ Each of these trends has a negative impact on the propensity to carpool, particularly as it relates to the work trip.

Motor Fuel Prices and Fuel Economy - The decline in carpool share for the work trip was the greatest in the 1980s when the real price of gasoline declined by 45 percent, from \$2.22 per gallon in 1980 to \$1.22 per gallon in 1990 (1993 dollars).¹⁶ However, it is believed that the real price of gasoline has reached its lower limit and will either keep pace with inflation or perhaps increase in the coming decade.

Figure 39
Estimated Annual Carpool Share (1970-1990)



Source: Erik Ferguson, "An Exegesis of Recent Nationwide Declines in Carpooling," Figure 5.

Age and Education - Educational attainment level in the U.S. has increased substantially in recent decades. The proportion of the U.S. population with a high school diploma or some advanced education increased from 66 percent in 1980 to 75 percent in 1990.¹⁷ In addition, the mean age of the U.S. population increased from 28.1 years in 1970 to 33.0 years in 1990.¹⁸ These changes are believed to contribute to a decline in carpool share.

Ferguson estimates that 96 percent of the decline in carpool share can be attributed to these three factors: 38 percent due to changes in household composition, 34 percent due to the reduction in the real price of fuel and changes in the fuel economy, and 24 percent due to an aging and more educated population.¹⁹

It is clear that the decline in carpool share is primarily the result of factors beyond the control of TDM professionals. However, it could be argued that the decline would have been greater had TDM not emerged or reemerged as an important strategy for many metropolitan areas of the U.S. over the past decade.

What Next?

What does this mean for the future of ridesharing? Although limited, data available describing recent trends in

ridesharing suggest that the decline in the commute share for this mode has stabilized in recent years and may be increasing slightly. Changes in the major factors identified previously cannot continue to be as dramatic as they have been in the past. For example, households can continue to become smaller only to a point; the real price of gasoline cannot continue to decline at the rate that it has in the 1980s; the rising cost of education suggests that fewer individuals will be able to afford higher education in the future.²⁰ As a result, the impact of these factors on the commute share for ridesharing will not be as significant in the coming decade as it was in the previous decade. The difficult task will be for TDM organizations to identify new and evolving strategies for encouraging and facilitating alternatives to the single-occupant automobile. This will include innovative efforts to maintain and potentially increase the commute mode share for ridesharing.

Conclusions

Based on recent trends and a review of literature on carpooling, four major recommendations are offered to carpool programs. These recommendations stem from the need for carpool programs and TDM organizations in general to more effectively adapt to evolving demographic and geographic trends in the U.S.

1. Identify and Learn From Areas of Success

TDM efforts need to be evaluated objectively so resources can be focused on proven actions. In the process of evaluating carpooling trends in localized areas, some geographic areas can be identified where carpooling has remained relatively stable or even increased from 1980 to 1990, both in absolute terms and in commute share. These areas can be identified at any geographic level using Census data, i.e., county, place, census tract, block group. Additional research should then be conducted on these successful areas to serve as case studies to identify the reasons for success and what specific actions could be applied in other areas. For example, a carpool program that serves a county could review the trends in carpool share for each census tract within that county. The characteristics of commuters residing in tracts in which the carpool share remained stable or increased could be identified and analyzed along with the characteristics of the commute (travel time, origin/destination, etc.). Significant potential exists for learning from tracts exhibiting a greater propensity for carpooling.

For additional guidance on the implementation of TDM measures, see "Making TDM Work in Your Community" by CUTR and *Implementing Effective Travel Demand Management Measures: A Series on TDM* by Comsis, et al.

2. Reconsider Focus of Program

The traditional focus of carpool programs has been on urban travel, with the primary objective being to market the program to employees of large businesses and companies within major activity centers. Programs should consider focusing some efforts on rural residents who commute long distances to cities. Longer commutes, both in distance and time, have traditionally been perhaps the most important variable in the carpool formation decision. Based on an evaluation of carpooling trends at the county level in North Carolina, Hartgen suggests that serious consideration should be given to replacing employer-focused programs in urban areas with residence-based programs in rural areas.²¹ Agencies interested in pursuing this type of program should be aware that efforts such

as these can result in some institutional conflicts between residential- and employer-focused programs that serve many of the same trips. Conflict usually arises when trying to determine which program should receive credit for these trips.

3. Use Target Marketing

In Section 4, the carpool share for the journey to work was presented for worker subgroups according to a series of demographic, geographic, and housing characteristics. The purpose of this effort was to identify market segments that appear to have a greater probability of carpooling based on the results of AHS surveys. There is some disagreement in the literature regarding whether this type of information is useful in predicting carpool formation. However, a review of descriptive statistics compiled from the AHS clearly indicates that certain market segments have a significantly greater carpool share than the national average.

Traditionally, organizations charged with encouraging and facilitating travel demand management initiatives, including ridesharing, have focused on the work destination side of the commute and especially during peak travel periods, i.e., 6 a.m. to 9 a.m. This makes sense since it is logical to assume that workers with commute destinations that are in close proximity would be good candidates for carpooling. In addition, nearly 62 percent of all vehicle trips made during the morning peak are home-based work trips. However, marketing efforts should be considered in an effort to penetrate more specific market segments.

Efforts to penetrate specific market segments could be initiated with two distinctly different approaches, including emphasis on the residential end or emphasis on the employment end. Narrowing the focus through target marketing should reduce not only the cost of undertaking some marketing initiatives, but also be more effective in reaching individuals who are more likely to participate in a carpool. The two approaches are discussed briefly below.

Residential End - As indicated previously, recent trends in the use of carpools can be used to identify existing and evolving market segments that appear to have a greater probability of becoming involved in a carpool. Once these market segments have been identified, the specific char-

acteristics of these segments must be located geographically within the region in which a given TDM organization serves. For many characteristics, this can be accomplished using Census data, which provide demographic and housing information at geographic levels down to the census tract and block group. Once certain tracts or block groups have been identified that include concentrations of these market segments, marketing efforts can be focused within these more limited geographic areas.

Employment End - One of the primary objectives of most TDM organizations is the development of a database of potential carpool applicants and the preparation of matchlists for these applicants in order to assist in carpool formation. The information collected from potential applicants usually includes characteristics such as those used to distinguish market segments using the AHS. Individuals with characteristics that suggest a greater probability for carpool formation could be specifically targeted for more aggressive marketing techniques, such as direct mail marketing or telephone solicitation.

4. Develop Evaluation Program

Many TDM programs in the U.S. do not have adequate evaluation programs in place. Without an evaluation mechanism, the effectiveness of the program cannot be determined. The objective should not be merely to count the number of matchpool applicants. Evaluation criteria should include data on the number of persons placed in carpools, how long they are maintained, and the change in share of total trips. Emphasis on reasonable and defensible evaluation and increased accountability should be one of the major goals of all TDM organizations.

These four recommendations do not provide all the answers. They do provide, however, a starting point from which various carpool programs and TDM organizations can initiate some objective research for determining what the best approaches will be for a given local area.

WORKING AT HOME

The type of employment of individuals working at home can vary significantly, from farmers to self-employed individuals to telecommuters in the strict sense of the word. Data collected in national surveys, such as the

Decennial Census and American Housing Survey, do not distinguish between these subcategories of working at home. Therefore, specific information regarding the proportion of workers in these subcategories is uncertain. For the purposes of this discussion, the focus is confined to telecommuting. The decision was made to focus on telecommuters since this population segment is believed to be largely untapped in a time period characterized by significant technological advances in telecommunications.

Since the late 1980s, many planners and decisionmakers in the transportation profession have placed a greater emphasis on the implementation of a variety of TDM activities to bring about declines in peak-period travel and in the utilization of single-occupant vehicles, thereby assisting in congestion reduction, air quality improvement, and energy conservation. One of the TDM techniques that has been drawing recent interest is telecommuting, which can be defined as "working at home or at an alternate location and communicating with the usual place of work using electronic or other means, instead of physically traveling to a more distant worksite."²² An important aspect of this particular TDM activity is that current information transfer technology can be utilized as a surrogate for the journey to work on a part- or full-time basis.

The advent of the Information Age has brought about a multitude of technological advances that are changing the face of the world and how communication and business transactions are conducted today. Personal computers, modems, fax machines, cellular phones, voice mail, fiber optics, and communications networks (e.g., Internet, CompuServe, Prodigy, etc.) are some of the innovations that have enabled, among other things, greater flexibility in current working arrangements. Given its widespread availability and continuing hardware cost reductions, telecommunications technology can now facilitate moving the work to the worker. Yet, although important and necessary, this is only one of the reasons why telecommuting is attracting the attention of the transportation community.

In addition to the advances in telecommunications and computer technology, several other factors have also contributed to the amount of interest that has been generated in telecommuting in the last several years. In his article "Telecommuting in the United States," Rathbone highlights a number of these factors:²³

- The documented results of some of the first U.S. telecommuting projects have become available. Many of the findings have been positive in terms of the benefits that telecommuting has yielded.
- Public policy and legislation have been adopted that directly or indirectly encourage telecommuting. Examples cited by Rathbone include:
 - the Clean Air Act of 1990;
 - the Americans with Disabilities Act of 1989;
 - the Intermodal Surface Transportation Efficiency Act of 1991;
 - the 1989 directive to the federal General Services Administration to implement telecommuting programs at federal agencies; and
 - the passage of legislation favorable to telecommuting in several states, including California, Florida, Virginia, and the state of Washington.
- The telecommuting success stories are being communicated to the corporate level where awareness of telecommuting's positive impacts on both employees and employers is beginning to grow.

Possibly due to supportive public policy and the success and benefits experienced by many of the early pilot projects, telecommuting in the U.S. appears to be growing. It was discussed previously in Section 5 that LINK Resources' "1993 National Work-at-Home Survey" indicated that there are 7.6 million telecommuters in the U.S., 38 percent more than the 5.5 million identified in LINK's 1991 survey.²⁴ According to LINK, approximately 75 percent of these telecommuters are "information workers," that is, persons with jobs in the various information industries such as programming, accounting, data processing, marketing, planning, and engineering, among others. These occupations lend themselves more readily to the concept of telecommuting than do assembly line or construction jobs. Tasks common to information workers, such as data entry, writing reports or proposals, extensive reading, or telephone communication, do not necessarily require them to be present in the office on a daily basis,

and often can be accomplished with only remote access to the office via telephone and/or computer.

It seems, then, that telecommuting has the potential for continued growth in the foreseeable future given that current employment trends suggest that the rise in the number of information workers and jobs will continue. Only 17 percent of U.S. workers had information- and service-related occupations in 1950; however, by 1980, the information/service worker share increased to more than 50 percent.²⁵ In addition, the many benefits that have resulted from early pilot projects provide strong incentives for further implementation of this particular TDM measure. The marketing and research literature for telecommuting is saturated with the various advantages that telecommuting can provide to employees, employers, and the community. Some of the more widely-promoted benefits that can result from a successful telecommuting program are presented in Table 5.²⁶

The remainder of this discussion summarizes the findings from a number of recent studies on telecommuting. Some of the studies are national in scope, while others present the experiences of smaller, more regional telecommuting efforts. Future assessments of the potential of and participation in telecommuting are presented and discussed to the extent that the literature allows. Unfortunately, forecasts are somewhat limited due to the more recent emphasis of this TDM technique. This is followed by a review of recent literature on implementation strategies that will promote the success of start-up telecommuting programs. The section concludes with a number of recommendations that will increase the successful implementation of telecommuting programs throughout the nation.

Recent Studies

Current studies on telecommuting and pilot telecommuting programs show encouraging results, although the true long-term impacts cannot be examined for some time. Since telecommuting is at such an early stage of development, it is difficult to predict its rate of growth or its complete transportation impacts. One of the most comprehensive studies on telecommuting, *Transportation Implications of Telecommuting*, was published by the U.S.

Table 5
Potential Benefits of Telecommuting

BENEFICIARY	POTENTIAL BENEFITS
The Employee	<ul style="list-style-type: none"> - reduces work commuting which can decrease stress and generate time savings - increases flexibility to work when most productive - reduces office-related distractions (e.g., meetings, socializing, etc.) - gives a greater sense of responsibility - improves morale and satisfaction - allows control of work environment - increases overall productivity - saves money on transportation costs and other employment-related expenses (e.g., purchase and laundering of work attire, lunches, etc.) - may be the only means for the mobility-limited or physically-impaired to acquire and maintain employment - allows pregnant employees to continue working longer if they choose - eases child care and elder care problems
The Employer	<ul style="list-style-type: none"> - improves quantity and quality of employees' work - reduces absenteeism/sick leave usage - increases ability to retain valuable employees, thus decreasing the cost of hiring and retraining new staff - enables recruitment from an expanded pool of workers, such as the elderly, the physically-impaired, and geographically-remote employees - improves worker morale, satisfaction, and motivation - saves on facility costs and other overhead expenses - increases employee adaptability which can promote a problem-solving environment - mitigates disruptions in a disaster - helps achieve compliance with air quality/trip reduction regulations
The Community	<ul style="list-style-type: none"> - reduces peak-period vehicle miles of travel by commuters - reduces fuel consumption, thereby conserving energy - improves air quality through the reduction of CO2 emissions - alleviates traffic congestion, possibly reducing the cost of and need for highway infrastructure expansion and/or maintenance - improves safety because of the decreased likelihood of traffic accidents resulting from less congestion - increases economic development opportunities for small communities since persons may not necessarily need to move to the city for a job

Source: California Department of Transportation, *Telecommuting: A Guide for Executives* and *Telecommuting: A Handbook to Help You Set up a Program at Your Company*; and *Telecommuting: Getting to Work Without Working to Get There*, Minnesota DOT Telecommuting Marketing Brochure.

Department of Transportation (USDOT) in April 1993.²⁷ The study is based on a literature review and a two-day USDOT workshop, and its primary focus is the potential reduction in highway traffic associated with telecommuting. Also discussed are some exogenous factors that could affect the growth of telecommuting, including:

- increase in government and local pressures
- increase in technological and network enhancements
- faster-than-projected implementation of enhanced technology
- increase in regulatory incentives (increases in taxes, parking fees, etc.)
- increase in direct incentives

The adoption of telecommuting as an alternative is formed by technical, economic, environmental, legal, social, and demographic characteristics and trends. It is gaining prominence through technology; the changing nature of workers, the work, and the workplace; congestion and its consequences; and environmental legislation.²⁸

Based on 1991 data, the report indicates that 53 percent of telecommuters are men, and 47 percent are women. Also, the typical telecommuter is between the ages of 35 and 37, is part of a dual-career household, and has a median income of \$40,000. Half of telecommuters have children under 18 years of age, while 25 percent have children under six years old.²⁹

This study also focuses on some net transportation impacts of telecommuting. For example, it is estimated that in 1992, 3,735 million vehicle miles of travel (VMT) were saved due to 1.6 percent of the workforce telecommuting. This figure represents 0.23 percent of total passenger car VMT and 0.70 percent of commuting VMT.³⁰

The principal conclusions of *Transportation Implications of Telecommuting* include:³¹

- Estimates of the future level and total impacts of telecommuting are as yet uncertain.
- Potential for significant transportation-related benefits is great.

- The level and impact of telecommuting depends on the local transportation environment and current TDM measures.
- Improvements in congestion and air quality brought about by telecommuting could be offset by the emergence of latent travel demand.
- Telecommuting could stimulate urban sprawl and result in adverse effects on land use and public transportation.
- Factors affecting the rate of growth of telecommuting include the uncertainty of employer benefits, and the substantial amount of time and effort needed to bring about major changes.
- Government agencies can play a vital role in encouraging and implementing telecommuting.
- Telecommuting can be an effective TDM measure, but it cannot be mandated.
- Ongoing research is necessary to define further the costs, benefits, and future impacts of telecommuting.

Section 2028 of the Energy Policy Act of 1992 required the U.S. Department of Energy (USDOE) to "conduct a study of the potential costs and benefits to the energy and transportation sectors of telecommuting."³² In response, the USDOE prepared *Energy Emissions and Social Consequences of Telecommuting*. While the USDOT focuses on direct effects of telecommuting, the USDOE expands upon the USDOT study by analyzing indirect effects, including the social and technological impacts of telecommuting. Key findings from this study indicate that energy and emissions benefits of telecommuting likely will not be offset entirely by the emergence of latent travel demand or geographical expansion of cities. For vehicle use and fuel use, the combined indirect effects of telecommuting seem to offset approximately half of the direct benefits. In no case, this study argues, will the benefits of telecommuting disappear completely.

A study by the University of California-Davis of 200 state workers in Sacramento examined some effects of telecommuting.³³ The results of this study suggest that

total trips are reduced by 20 percent if a person telecommutes twice per week, work trips decrease 30 percent, non-work trips decrease 10 percent, and total trip distance declines by nearly 30 percent. In addition, peak trips are reduced by approximately one-third in the morning, and about 10 percent in the evening.

Using three-day travel diaries, Kitamura et al. studied the impact of telecommuting on household travel in conjunction with the State of California Telecommuting Pilot Project for state government employees.³⁴ Findings from this study, "An Evaluation of Telecommuting as a Trip Reduction Measure," are that telecommuting leads to a substantial reduction in trip generation, vehicle miles traveled, peak period travel, car use, and freeway travel. It does not lead to an increase in non-work trips. Sampath et al. used the same data to report preliminary findings from an empirical study of the emissions impacts of telecommuting.³⁵ They found that telecommuting results in a significant reduction in the number of cold engine starts along with a decrease in the distance traveled. These two factors lead to a decrease in emissions. However, the question remains whether enough people will telecommute often enough to make a difference.

Telecommuting can affect travel in numerous ways both in the short- and long-term. Mokhtarian also used the survey data from the State of California Telecommuting Pilot Project to examine other transportation impacts of telecommuting, such as time, place, and frequency of travel, who makes what trips, mode choice, and residential location.³⁶ The average frequency of telecommuting is slightly more than one day per week per person, and approximately 24 person miles (or 22 vehicle miles) of commute distance are saved during each telecommute occurrence. In addition, very few new trips are created: almost four times as many vehicle miles of travel are saved as are generated. Telecommuting is found to affect the time, mode, and destination of travel, as well as who makes the trip. However, it is not found to impact household auto ownership. Impacts on residential location are determined to be long-term effects of telecommuting, and could possibly increase the amount of work travel for some.

Some studies argue that telecommuting can save money, thus resulting in positive net benefits. Arthur D. Little, Inc.,

conducted a study for several telephone companies and concluded that \$23.2 billion in annual benefits can be accrued if between 10 and 20 percent of activities currently requiring transportation are instead accomplished by telecommuting.³⁷ These benefits would be obtained through increased productivity, decreased energy consumption and pollution, decreased transportation infrastructure maintenance costs, and increased leisure hours.

In 1992, COMSIS Corporation developed materials that would support the development of telecommuting programs within the private sector of California. The final report describes the three main aspects of those efforts. First, a marketing memorandum was submitted to Caltrans relating potential marketing strategies. In addition, a series of materials was produced and distributed to targeted companies with telecommuting potential. Finally, two telecommuting workshops were conducted for TDM service providers. The report notes that telecommuting is at a "break-through point," where widespread implementation is possible. Specific recommendations for Caltrans are provided and a comprehensive marketing strategy to position telecommuting as a "mode that directly enhances business operations" is stressed.³⁸

Denver recently hosted several productive TRP (Travel Reduction Program) 2000 seminars, which focused primarily on telecommuting.³⁹ These seminars were directed at management and included a wide range of strategies for businesses. Telecommuting was promoted as an increasingly common cost-saving tool for management, as a way of "unloading" expensive office space. Also presented were success stories of local businesses and their experiences with telecommuting.

As evaluations of pilot telecommuting projects in California and elsewhere are conducted, an extensive federal pilot telecommuting program is proving itself to be a success. This particular program was implemented by the U.S. Office of Personnel Management (OPM) in January 1990 and involved 700 Federal employees. The project, known as Flexiplace, was analyzed utilizing survey questionnaires covering three rating periods: the baseline period (six months immediately preceding implementation), the first six months of the pilot, and the last six months of the pilot.⁴⁰ Findings of this evaluation include the following:

- Thirty-five percent of the participants in this project indicated a decline in peak period travel.
- More than 90 percent of supervisors and 95 percent of participants noted that job performance remained unchanged or improved in comparison to performance preceding the implementation of the program.
- More than 90 percent of all respondents (participants and their supervisors) believed there was no change in the effectiveness of work-related interpersonal communication, and of those sensing a change, most perceived an increase in communication effectiveness.
- More than 90 percent of the supervisors indicated that Flexiplace did not result in significant organizational expenses.
- In general, Flexiplace has been recommended for adoption by those federal agencies where telecommuting is feasible.

In October 1993, the White House issued the "Climate Change Action Plan." This plan consists of almost 50 strategies to reduce greenhouse gases to 1990 levels by the year 2000.⁴¹ One of the strategies directs the USDOT to implement and assess a federal employee telecommuting program, evaluate other telecommuting programs in both the public and private sectors, and promote greater use of telecommuting throughout the country. One means of promoting telecommuting is through outreach methods, such as the open house held in Washington, D.C. in November 1994, where representatives of the four telecommuting centers in the Washington area shared information about telecommuting. In addition, a telecommuting seminar will be held in Seattle to encourage Federal agencies there to adopt such programs. Nationally, the Climate Change Action Plan set a goal of one to two percent of the workforce telecommuting at least one day per week. Federal agencies have a goal of three percent of their employees telecommuting at least one day per week within two years. In addition, President Clinton recently directed the heads of federal departments and agencies to establish programs and encourage the expansion of flexible, "family-friendly" work arrangements, including job sharing, career part-time employment, alter-

native work schedules, satellite work locations, and telecommuting.⁴²

Rathbone, in "Telecommuting in the United States," mentions that approximately 54 percent of the total labor force is currently engaged in occupations which are suitable for telecommuting.⁴³ According to USDOT's *Transportation Implications of Telecommuting*, the labor force can be divided into information workers (discussed earlier) and all other workers.⁴⁴ It can be assumed that, due to the nature of their work, some percentage of the information workers will telecommute. The USDOT report estimates that information workers currently constitute approximately 56 percent of the U.S. workforce, and that percentage is expected to gradually increase to about 59 percent by 2002.⁴⁵ Additionally, *The Urban Transportation Monitor* reported in 1992 that the estimated maximum percentage of organizations' employees who could telecommute was 32 percent.⁴⁶

In "Telecommuting in the United States: Letting our Fingers Do the Commuting," Mokhtarian writes that the market for at least part-time telecommuting is broadening; perhaps even beyond the realm of the information worker.⁴⁷ People employed in social services (i.e., probation officers, health inspectors, social workers), for example, can handle telephone and paperwork from home. She stresses the need for additional research on the amount of telecommuting and its effects on aggregate travel behavior, especially energy and air quality impacts, interactions with other TDM strategies, impacts on mode choice and residential location, the role of telecommuting in the traditional urban travel demand forecasting process, and on area telecommuting centers, which are becoming another reasonable commute option.

Despite all the documented benefits and success stories, a number of concerns have been expressed about telecommuting and projections of its future potential. Unfortunately, many of the projections are being based on only a few years of data on the telecommuter population in the U.S. One reason for the variation in these data from source to source involves definitional differences and the difficulty in distinguishing actual telecommuters from other persons in the general work-at-home category. Additionally, the data gathered by organizations such as LINK Resources and the Telecommuting Research Institute

have indicated significant average annual growth rates in the U.S. telecommuter population in the last several years.⁴⁸ The use of this information as baseline data for telecommuter population forecasts seems to have resulted in overly optimistic projections. It may be too early in the maturation process of this TDM measure to be able to accurately forecast future participation.

Instead of attempting to project the extent to which telecommuting will be utilized in the future, some of the literature raises issues involving the factors that may eventually limit telecommuting. As one of the more recent TDM measures, it is obvious that changes in the traditional work environment brought about by telecommuting may meet with some resistance. Management methods are going to have to evolve to deal with telecommuting employees, but it may be difficult due to force of habit. It is possible that overall employer policies may serve as an obstacle to the implementation of telecommuting on any worthwhile scale, as could union by-laws and requirements for certain industries. One of the chief concerns for employees is the need for face-to-face, social interaction. This need may ultimately determine the upper limit on how often a person could realistically telecommute during any given time period. One to two days per week is currently the typical average telecommuting frequency.⁴⁹ Other employee concerns include the following:⁵⁰

- Decreased visibility may hinder an employee's opportunity for a raise or promotion.
- Proper work space may not be available in some employees' homes.
- Home utility expenses may increase significantly.
- The separation of "work" and "home" may become increasingly difficult.
- Tendencies toward "workaholism" may be aggravated.

Some researchers believe that the current literature leaves an "unresolved picture" of the transportation implications of telecommuting, since some studies show that long-term effects may include increased number of non-work related home-based trips (since telecommuters will not be able to link trips during their morning or evening com-

mute), the generation of new trips from the emergence of latent travel demand, and that some telecommuters may choose to live further from work, possibly increasing overall miles of travel.⁵¹ In addition, the possibility exists that a telecommuter's vehicle may be used by a family member or friend, resulting in a trip that would not otherwise have been made. Thus, some of the literature concludes that telecommuting will not have any significant impacts on vehicle transportation or the aggregate consumption of motor fuels.

To summarize, it is not yet clear what the future holds for telecommuting as a formal commute alternative policy initiative. Currently, LINK estimates that less than half of the 7.6 million telecommuters in the U.S. participate in formal work-at-home programs.⁵² For the most part, telecommuting in the U.S. is relatively informal and takes place on a part-time basis. Proponents point out that telecommuting will not only reduce traffic congestion, fuel consumption, and air pollution, but it will also help improve employee productivity, retention, and morale; reduce absenteeism and sick leave usage; and benefit companies through reduced real estate costs and employee recruitment and training costs. On the other hand, the literature also contains less optimistic viewpoints that argue that telecommuting may result in increased non-work travel, or that it can possibly stimulate urban sprawl in addition to having adverse impacts on public transportation and ridesharing.⁵³

Unfortunately, much of the information available on telecommuting's current success and future potential is seemingly inconclusive, and often contrary in nature. In order to formulate better policy strategies, additional data will be needed, as will further research on the actual benefits and disadvantages of telecommuting, and a clearer understanding of a person's motivation to use or not to use this commute alternative.

Conclusions

Curiously, of those who study future trends and call for less dependence on fossil fuels and decreased traffic congestion and energy use, very few deal directly with telecommuting as a means of reaching these ends. However, according to *The Road to 2012: Looking Towards*

the Next Two Decades, moving information instead of people is becoming more prevalent.⁵⁴ Several quotes from prominent government and business individuals stress the importance of telecommuting in the future:

*"We can also replace conventional commuting wherever possible with what is now known as telecommuting. This technology is already in widespread use, as increasing numbers of people work at home but keep a direct connection to co-workers through a communications link between their computer stations. As the capacity of computer networks increases, this trend is likely to accelerate."*⁵⁵

— Vice President Albert Gore

*"I cannot think of a better way to launch any organization into the '90s - including my own - than by exploring...telecommuting."*⁵⁶

— Tom Peters, President, Tom Peters Group

*"If an organization is looking for ways to be more environmentally responsible - and to make its employees more productive or to keep its more productive employees - then telecommuting should be considered."*⁵⁷

— Dick Watson, Washington State Energy Office

*"Sometimes the best transportation policy means not moving people, but moving their work...Think of it as commuting to work at the speed of light."*⁵⁸

— President George Bush

Our contemporary transportation system has facilitated job, housing, and business opportunities in dispersed locations, and the use of these locations has been made more simple by significant improvements in telecommunications technology.⁵⁹ However, the scattered pattern of land use which has resulted cannot continue to be supported by the current transportation system. A new way of moving people to their work must be developed. A possible way of alleviating this problem is moving the work to the people through the widespread implementation of telecommuting. Telecommuting may not be a complete solution, but it can serve as a "bridge to the future" while the relationship between land use, density, and the supporting transportation system is reexamined.⁶⁰ Instead of

increasing transportation capacity at ever-growing costs, ways to provide access through telecommunications can be explored, perhaps through utilization of the flexible-funding features of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. ISTEA, along with the 1990 Federal Clean Air Act Amendments and federal economic growth policies, can expedite strategies and actions to replace travel demand with telecommunications services and telecommuting.

There is not always agreement in the literature on the rate of growth of telecommuting, the presence and magnitude of its potential advantages and disadvantages, and the extent to which these advantages and disadvantages will affect the transportation system. However, current literature does tend to concede on what conditions are necessary within an organization to achieve the maximum possible benefits (for employees and their families, employers, organizations, and society) from a telecommuting program. The most commonly stated preconditions are listed below.⁶¹

- **Suitable job** - The work must be able to be performed (at least in part) at a remote location.
- **Suitable employees** - The personal characteristics and abilities of the employee must be suited to working with no direct supervision.
- **Suitable telecommuting workplace** - The employee must have a place to work that is free of distractions.
- **Top-down support is vital** - The organization must consider telecommuting as a reasonable and desirable alternative. Senior management must provide support.
- **Senior management support is necessary** - All managers and decisionmakers within the organization must accept the idea and practice of telecommuting.
- **Telecommuters and their supervisors must be volunteers** - Both employees and managers must feel comfortable with telecommuting in terms of its suitability to personal work habits, its effects on social interaction and career advancement,

and its impacts on management style and the organization.

- **Training is key** - Significantly higher performance results are noted when both the telecommuters and their direct supervisors participated in telecommuting-specific training prior to initiating a program.
- **Availability of adequate, cost-effective technology** - It is essential that the telecommuter has sufficient technological equipment to complete work at home. However, most of the literature finds that major capital investments are not necessary.

It is clear that a better understanding of telecommuting and its potential market will be necessary to properly incorporate this technique into today's travel demand management arsenal. Knowledge on which jobs and individuals are amenable to the prospect of telecommuting is important to its future success, as is understanding why people will or will not choose to participate in or support telecommuting. The fortune of subsequent telecommuting programs will depend on proper implementation, the sup-

port of all parties involved, and the avoidance of the pitfalls that predecessors may have encountered. Since many benefits will be realized no matter if the level of implementation is national, regional, or merely local, it is imperative that planners and decisionmakers concentrate on starting telecommuting programs, and not on potential limiting factors or projections of future participation.

SUMMARY

Encouraging the use of commuting alternatives, such as public transportation, ridesharing, and working at home, will continue to be a significant challenge for the transportation profession. This section was prepared to offer some insight as to the future of commuting alternatives in the United States. Based on recent trends and a review of recent literature, several conclusions and recommendations were offered for each commuting alternative. It is hoped that this information will provide assistance to those responsible for marketing these alternatives and, in turn, to maintain and perhaps increase the commute share of these alternatives in many local areas throughout the United States.

APPENDIX A: URBAN AREA COMPARISONS

A database of population, demographic, and journey-to-work characteristics was compiled for urban areas in the U.S. with a population exceeding 500,000 in 1990. Since this information may be useful to transportation planners and decisionmakers, this information is provided in this appendix. This enables the identification of areas with similar characteristics which can then be contacted, potentially resulting in opportunities to learn from experiences in other parts of the country. The following data elements were compiled for urbanized areas in the U.S. as defined by the Census Bureau. In addition, the urbanized areas are ranked for each data element.

- Total Population
- Number of Workers
- Employment/Population Ratio
- Age < 16, Percent of Total Population
- Age 16 to 59, Percent of Total Population
- Age 60+, Percent of Total Population
- Age 65+, Percent of Total Population
- Did Not Finish High School, Percent of Persons Age 18+
- Females, Percent of Total Population
- Minorities, Percent of Total Population
- Median Household Income
- Household Size
- Below Poverty Level, Percent of Total Population
- Work Disability, Percent of Civilians Age 15+
- Carpool/Vanpool to Work, Percent of Workers Age 16+
- Use Transit for Work Trip, Percent of Workers Age 16+
- Work at Home, Percent of Workers Age 16+
- Average Travel Time to Work (minutes)
- Drive Alone to Work, Percent of Workers Age 16+
- Work Departure Time 6-8 a.m., Percent of Workers Age 16+
- Work Departure Time 6-9 a.m., Percent of Workers Age 16+
- Work Outside Home County or State, Percent of Workers Age 16+
- 0-Vehicle Households, Percent of Total Households
- Number of Private Vehicles per Household
- Number of Workers per Household

Table 6
Total Population

UNITED STATES	248,709,873	—
New York, NY--Northeastern New Jersey	16,044,012	1
Los Angeles, CA	11,402,946	2
Chicago, IL--Northwestern Indiana	6,792,087	3
Philadelphia, PA--NJ	4,222,211	4
Detroit, MI	3,697,529	5
San Francisco--Oakland, CA	3,629,516	6
Washington, DC--MD--VA	3,363,031	7
Dallas--Fort Worth, TX	3,198,259	8
Houston, TX	2,901,851	9
Boston, MA	2,775,370	10
San Diego, CA	2,348,417	11
Atlanta, GA	2,157,806	12
Minneapolis--St. Paul, MN	2,079,676	13
Phoenix, AZ	2,006,239	14
St. Louis, MO--IL	1,946,526	15
Miami--Hialeah, FL	1,914,660	16
Baltimore, MD	1,889,873	17
Seattle, WA	1,744,086	18
Tampa--St. Petersburg--Clearwater, FL	1,708,710	19
Pittsburgh, PA	1,678,745	20
Cleveland, OH	1,677,492	21
Denver, CO	1,517,977	22
San Jose, CA	1,435,019	23
Norfolk--Virginia Beach--Newport News, VA	1,323,098	24
Kansas City, MO--KS	1,275,317	25
Fort Lauderdale--Hollywood--Pompano Beach, FL	1,238,134	26
Milwaukee, WI	1,226,293	27
Cincinnati, OH--KY	1,212,675	28
Portland--Vancouver, OR--WA	1,172,158	29
Riverside--San Bernardino, CA	1,170,196	30
San Antonio, TX	1,129,154	31
Sacramento, CA	1,097,005	32
New Orleans, LA	1,040,226	33
Buffalo--Niagara Falls, NY	954,332	34
Columbus, OH	945,237	35
Indianapolis, IN	914,761	36
Orlando, FL	887,126	37
Providence--Pawtucket, RI--MA	846,293	38
Memphis, TN--AR--MS	825,193	39
West Palm Beach--Boca Raton--Delray Beach, FL	794,848	40
Salt Lake City, UT	789,447	41
Oklahoma City, OK	784,425	42
Louisville, KY--IN	754,956	43
Jacksonville, FL	738,413	44
Las Vegas, NV	697,348	45
Honolulu, HI	632,603	46
Birmingham, AL	622,074	47
Rochester, NY	619,653	48
Dayton, OH	613,467	49
Richmond, VA	589,980	50
Tucson, AZ	579,235	51
Nashville, TN	573,294	52
El Paso, TX--NM	571,017	53
Austin, TX	562,008	54
Hartford--Middletown, CT	546,198	55
Omaha, NE--IA	544,292	56
Springfield, MA--CT	532,747	57
Akron, OH	527,863	58
Albany--Schenectady--Troy, NY	509,106	59

Table 7
Number of Workers

UNITED STATES	115,070,274	—
New York, NY--Northeastern New Jersey	7,528,518	1
Los Angeles, CA	5,457,037	2
Chicago, IL--Northwestern Indiana	3,217,690	3
Philadelphia, PA--NJ	1,959,405	4
Washington, DC--MD--VA	1,912,605	5
San Francisco--Oakland, CA	1,859,904	6
Dallas--Fort Worth, TX	1,642,966	7
Detroit, MI	1,613,125	8
Boston, MA	1,442,168	9
Houston, TX	1,401,906	10
San Diego, CA	1,160,790	11
Atlanta, GA	1,148,978	12
Minneapolis--St. Paul, MN	1,116,683	13
Phoenix, AZ	949,681	14
Baltimore, MD	928,084	15
Seattle, WA	927,316	16
St. Louis, MO--IL	918,967	17
Miami--Hialeah, FL	878,549	18
Denver, CO	789,327	19
Tampa--St. Petersburg--Clearwater, FL	780,275	20
San Jose, CA	766,234	21
Cleveland, OH	752,260	22
Pittsburgh, PA	735,310	23
Norfolk--Virginia Beach--Newport News, VA	662,616	24
Kansas City, MO--KS	636,759	25
Portland--Vancouver, OR--WA	582,478	26
Milwaukee, WI	582,205	27
Fort Lauderdale--Hollywood--Pompano Beach, FL	578,869	28
Cincinnati, OH--KY	570,304	29
Sacramento, CA	507,788	30
Riverside--San Bernardino, CA	495,769	31
San Antonio, TX	492,678	32
Columbus, OH	479,012	33
Orlando, FL	467,196	34
Indianapolis, IN	458,907	35
New Orleans, LA	433,327	36
Buffalo--Niagara Falls, NY	422,980	37
Providence--Pawtucket, RI--MA	403,974	38
Oklahoma City, OK	376,756	39
Memphis, TN--AR--MS	375,523	40
Jacksonville, FL	368,307	41
Salt Lake City, UT	357,260	42
Louisville, KY--IN	352,717	43
Las Vegas, NV	351,935	44
West Palm Beach--Boca Raton--Delray Beach, FL	350,622	45
Honolulu, HI	336,364	46
Richmond, VA	306,362	47
Rochester, NY	298,539	48
Austin, TX	297,716	49
Nashville, TN	294,184	50
Dayton, OH	285,924	51
Birmingham, AL	278,312	52
Omaha, NE--IA	275,880	53
Hartford--Middletown, CT	273,152	54
Tucson, AZ	261,730	55
Albany--Schenectady--Troy, NY	249,865	56
Springfield, MA--CT	249,071	57
Akron, OH	234,835	58
El Paso, TX--NM	219,684	59

Table 8
Worker/Population Ratio

Washington, DC--MD--VA	56.87%	1
Minneapolis--St. Paul, MN	53.70%	2
San Jose, CA	53.40%	3
Atlanta, GA	53.25%	4
Honolulu, HI	53.17%	5
Seattle, WA	53.17%	6
Austin, TX	52.97%	7
Orlando, FL	52.66%	8
Denver, CO	52.00%	9
Boston, MA	51.96%	10
Richmond, VA	51.93%	11
Dallas--Fort Worth, TX	51.37%	12
Nashville, TN	51.31%	13
San Francisco--Oakland, CA	51.24%	14
Omaha, NE--IA	50.69%	15
Columbus, OH	50.68%	16
Las Vegas, NV	50.47%	17
Indianapolis, IN	50.17%	18
Norfolk--Virginia Beach--Newport News, VA	50.08%	19
Hartford--Middletown, CT	50.01%	20
Kansas City, MO--KS	49.93%	21
Jacksonville, FL	49.88%	22
Portland--Vancouver, OR--WA	49.69%	23
San Diego, CA	49.43%	24
Baltimore, MD	49.11%	25
Albany--Schenectady--Troy, NY	49.08%	26
Houston, TX	48.31%	27
Rochester, NY	48.18%	28
Oklahoma City, OK	48.03%	29
Los Angeles, CA	47.86%	30
Providence--Pawtucket, RI--MA	47.73%	31
Milwaukee, WI	47.48%	32
Chicago, IL--Northwestern Indiana	47.37%	33
Phoenix, AZ	47.34%	34
St. Louis, MO--IL	47.21%	35
Cincinnati, OH--KY	47.03%	36
New York, NY--Northeastern New Jersey	46.92%	37
Fort Lauderdale--Hollywood--Pompano Beach, FL	46.75%	38
Springfield, MA--CT	46.75%	39
Louisville, KY--IN	46.72%	40
Dayton, OH	46.61%	41
Philadelphia, PA--NJ	46.41%	42
Sacramento, CA	46.29%	43
UNITED STATES	46.27%	-
Miami--Hialeah, FL	45.89%	44
Tampa--St. Petersburg--Clearwater, FL	45.66%	45
Memphis, TN--AR--MS	45.51%	46
Salt Lake City, UT	45.25%	47
Tucson, AZ	45.19%	48
Cleveland, OH	44.84%	49
Birmingham, AL	44.74%	50
Akron, OH	44.49%	51
Buffalo--Niagara Falls, NY	44.32%	52
West Palm Beach--Boca Raton--Delray Beach, FL	44.11%	53
Pittsburgh, PA	43.80%	54
San Antonio, TX	43.63%	55
Detroit, MI	43.63%	56
Riverside--San Bernardino, CA	42.37%	57
New Orleans, LA	41.66%	58
El Paso, TX--NM	38.47%	59

Table 9
Age < 16, Percent of Total Population

Salt Lake City, UT	31.84%	1
Riverside--San Bernardino, CA	28.73%	2
El Paso, TX--NM	28.67%	3
San Antonio, TX	26.00%	4
Houston, TX	25.83%	5
Omaha, NE--IA	24.98%	6
Memphis, TN--AR--MS	24.76%	7
New Orleans, LA	24.38%	8
Dallas--Fort Worth, TX	24.28%	9
Sacramento, CA	24.11%	10
Cincinnati, OH--KY	23.95%	11
Norfolk--Virginia Beach--Newport News, VA	23.95%	12
Oklahoma City, OK	23.77%	13
Kansas City, MO--KS	23.47%	14
Jacksonville, FL	23.44%	15
Phoenix, AZ	23.39%	16
Indianapolis, IN	23.31%	17
Milwaukee, WI	23.22%	18
Los Angeles, CA	23.19%	19
Denver, CO	23.19%	20
St. Louis, MO--IL	23.19%	21
Minneapolis--St. Paul, MN	23.09%	22
Chicago, IL--Northwestern Indiana	22.91%	23
UNITED STATES	22.87%	-
Detroit, MI	22.83%	24
Atlanta, GA	22.61%	25
Tucson, AZ	22.59%	26
Birmingham, AL	22.49%	27
Portland--Vancouver, OR--WA	22.49%	28
Dayton, OH	22.34%	29
Columbus, OH	22.24%	30
Las Vegas, NV	22.12%	31
San Diego, CA	22.08%	32
Rochester, NY	21.87%	33
Austin, TX	21.87%	34
Louisville, KY--IN	21.85%	35
Orlando, FL	21.62%	36
Richmond, VA	21.62%	37
Philadelphia, PA--NJ	21.60%	38
Cleveland, OH	21.60%	39
Baltimore, MD	21.58%	40
Akron, OH	21.49%	41
Miami--Hialeah, FL	21.49%	42
Springfield, MA--CT	21.33%	43
San Jose, CA	21.29%	44
Nashville, TN	20.93%	45
Seattle, WA	20.90%	46
Honolulu, HI	20.72%	47
Buffalo--Niagara Falls, NY	20.65%	48
Washington, DC--MD--VA	20.45%	49
New York, NY--Northeastern New Jersey	20.34%	50
Providence--Pawtucket, RI--MA	20.11%	51
Hartford--Middletown, CT	19.84%	52
San Francisco--Oakland, CA	19.53%	53
Albany--Schenectady--Troy, NY	19.39%	54
Pittsburgh, PA	19.01%	55
Fort Lauderdale--Hollywood--Pompano Beach, FL	18.23%	56
Tampa--St. Petersburg--Clearwater, FL	17.96%	57
Boston, MA	17.88%	58
West Palm Beach--Boca Raton--Delray Beach, FL	16.78%	59

Table 10
Age 16 to 59, Percent of Total Population

Austin, TX	68.70%	1
Washington, DC--MD--VA	67.32%	2
Atlanta, GA	66.70%	3
San Jose, CA	66.46%	4
Dallas--Fort Worth, TX	64.66%	5
Seattle, WA	64.50%	6
Columbus, OH	64.45%	7
San Francisco--Oakland, CA	64.37%	8
Boston, MA	64.26%	9
Houston, TX	64.15%	10
Nashville, TN	64.02%	11
Orlando, FL	63.81%	12
Los Angeles, CA	63.73%	13
Norfolk--Virginia Beach--Newport News, VA	63.68%	14
Denver, CO	63.54%	15
San Diego, CA	63.49%	16
Minneapolis--St. Paul, MN	63.40%	17
Las Vegas, NV	63.13%	18
Richmond, VA	62.84%	19
Honolulu, HI	62.74%	20
Jacksonville, FL	62.13%	21
Baltimore, MD	62.02%	22
New York, NY--Northeastern New Jersey	61.78%	23
Portland--Vancouver, OR--WA	61.62%	24
Oklahoma City, OK	61.62%	25
Sacramento, CA	61.46%	26
Indianapolis, IN	61.45%	27
Chicago, IL--Northwestern Indiana	61.15%	28
Hartford--Middletown, CT	61.13%	29
Dayton, OH	61.04%	30
Albany--Schenectady--Troy, NY	60.94%	31
Memphis, TN--AR--MS	60.89%	32
Tucson, AZ	60.78%	33
Rochester, NY	60.78%	34
Kansas City, MO--KS	60.73%	35
Omaha, NE--IA	60.72%	36
San Antonio, TX	60.47%	37
UNITED STATES	60.32%	--
Detroit, MI	60.30%	38
Phoenix, AZ	60.21%	39
Riverside--San Bernardino, CA	60.04%	40
Akron, OH	59.93%	41
New Orleans, LA	59.88%	42
Louisville, KY--IN	59.85%	43
Philadelphia, PA--NJ	59.79%	44
Miami--Hialeah, FL	59.75%	45
Providence--Pawtucket, RI--MA	59.75%	46
Springfield, MA--CT	59.61%	47
El Paso, TX--NM	59.43%	48
Milwaukee, WI	59.39%	49
St. Louis, MO--IL	59.37%	50
Cincinnati, OH--KY	59.36%	51
Birmingham, AL	59.26%	52
Cleveland, OH	58.45%	53
Buffalo--Niagara Falls, NY	58.31%	54
Pittsburgh, PA	57.54%	55
Salt Lake City, UT	56.68%	56
Fort Lauderdale--Hollywood--Pompano Beach, FL	56.08%	57
Tampa--St. Petersburg--Clearwater, FL	55.57%	58
West Palm Beach--Boca Raton--Delray Beach, FL	51.72%	59

Table 11
Age 60+, Percent of Total Population

West Palm Beach–Boca Raton–Delray Beach, FL	31.50%	1
Tampa–St. Petersburg–Clearwater, FL	26.46%	2
Fort Lauderdale–Hollywood–Pompano Beach, FL	25.69%	3
Pittsburgh, PA	23.45%	4
Buffalo–Niagara Falls, NY	21.04%	5
Providence–Pawtucket, RI–MA	20.14%	6
Cleveland, OH	19.95%	7
Albany–Schenectady–Troy, NY	19.67%	8
Springfield, MA–CT	19.06%	9
Hartford–Middletown, CT	19.03%	10
Miami–Hialeah, FL	18.76%	11
Philadelphia, PA–NJ	18.61%	12
Akron, OH	18.57%	13
Louisville, KY–IN	18.30%	14
Birmingham, AL	18.25%	15
New York, NY–Northeastern New Jersey	17.88%	16
Boston, MA	17.86%	17
St. Louis, MO–IL	17.45%	18
Milwaukee, WI	17.39%	19
Rochester, NY	17.34%	20
Detroit, MI	16.86%	21
UNITED STATES	16.82%	—
Cincinnati, OH–KY	16.69%	22
Tucson, AZ	16.62%	23
Dayton, OH	16.62%	24
Honolulu, HI	16.55%	25
Baltimore, MD	16.39%	26
Phoenix, AZ	16.39%	27
San Francisco–Oakland, CA	16.10%	28
Chicago, IL–Northwestern Indiana	15.94%	29
Portland–Vancouver, OR–WA	15.89%	30
Kansas City, MO–KS	15.79%	31
New Orleans, LA	15.75%	32
Richmond, VA	15.54%	33
Indianapolis, IN	15.24%	34
Nashville, TN	15.04%	35
Las Vegas, NV	14.74%	36
Oklahoma City, OK	14.61%	37
Seattle, WA	14.59%	38
Orlando, FL	14.57%	39
Sacramento, CA	14.44%	40
San Diego, CA	14.43%	41
Jacksonville, FL	14.43%	42
Memphis, TN–AR–MS	14.35%	43
Omaha, NE–IA	14.30%	44
San Antonio, TX	13.54%	45
Minneapolis–St. Paul, MN	13.51%	46
Columbus, OH	13.31%	47
Denver, CO	13.26%	48
Los Angeles, CA	13.08%	49
Norfolk–Virginia Beach–Newport News, VA	12.38%	50
San Jose, CA	12.24%	51
Washington, DC–MD–VA	12.23%	52
El Paso, TX–NM	11.90%	53
Salt Lake City, UT	11.47%	54
Riverside–San Bernardino, CA	11.23%	55
Dallas–Fort Worth, TX	11.06%	56
Atlanta, GA	10.69%	57
Houston, TX	10.02%	58
Austin, TX	9.43%	59

Table 12
Age 65+, Percent of Total Population

West Palm Beach--Boca Raton--Delray Beach, FL	25.84%	1
Tampa--St. Petersburg--Clearwater, FL	21.18%	2
Fort Lauderdale--Hollywood--Pompano Beach, FL	21.00%	3
Pittsburgh, PA	17.61%	4
Buffalo--Niagara Falls, NY	15.77%	5
Providence--Pawtucket, RI--MA	15.37%	6
Albany--Schenectady--Troy, NY	15.01%	7
Cleveland, OH	14.91%	8
Hartford--Middletown, CT	14.52%	9
Springfield, MA--CT	14.47%	10
Miami--Hialeah, FL	14.05%	11
Philadelphia, PA--NJ	13.88%	12
Akron, OH	13.80%	13
Birmingham, AL	13.63%	14
Louisville, KY--IN	13.52%	15
Boston, MA	13.42%	16
New York, NY--Northeastern New Jersey	13.18%	17
Rochester, NY	13.14%	18
St. Louis, MO--IL	13.01%	19
Milwaukee, WI	12.96%	20
Tucson, AZ	12.60%	21
Phoenix, AZ	12.57%	22
UNITED STATES	12.54%	--
Cincinnati, OH--KY	12.38%	23
Detroit, MI	12.28%	24
Portland--Vancouver, OR--WA	12.19%	25
Baltimore, MD	12.08%	26
Dayton, OH	12.07%	27
San Francisco--Oakland, CA	12.02%	28
Honolulu, HI	11.94%	29
Chicago, IL--Northwestern Indiana	11.69%	30
Kansas City, MO--KS	11.68%	31
Richmond, VA	11.54%	32
New Orleans, LA	11.48%	33
Indianapolis, IN	11.18%	34
Nashville, TN	11.06%	35
Seattle, WA	10.94%	36
San Diego, CA	10.92%	37
Oklahoma City, OK	10.71%	38
Orlando, FL	10.66%	39
Sacramento, CA	10.64%	40
Memphis, TN--AR--MS	10.53%	41
Omaha, NE--IA	10.52%	42
Jacksonville, FL	10.49%	43
Las Vegas, NV	10.28%	44
Minneapolis--St. Paul, MN	10.01%	45
San Antonio, TX	9.94%	46
Denver, CO	9.58%	47
Columbus, OH	9.58%	48
Los Angeles, CA	9.54%	49
Norfolk--Virginia Beach--Newport News, VA	8.95%	50
San Jose, CA	8.74%	51
Washington, DC--MD--VA	8.73%	52
Salt Lake City, UT	8.44%	53
Riverside--San Bernardino, CA	8.31%	54
El Paso, TX--NM	8.22%	55
Dallas--Fort Worth, TX	7.92%	56
Atlanta, GA	7.63%	57
Houston, TX	6.90%	58
Austin, TX	6.87%	59

Table 13
Did Not Finish High School, Percent of Persons Age 18+

El Paso, TX--NM	36.19%	1
Miami--Hialeah, FL	35.03%	2
Providence--Pawtucket, RI--MA	29.96%	3
New Orleans, LA	28.04%	4
Los Angeles, CA	27.59%	5
San Antonio, TX	27.30%	6
Baltimore, MD	26.94%	7
Louisville, KY--IN	26.39%	8
New York, NY--Northeastern New Jersey	25.97%	9
Memphis, TN--AR--MS	25.64%	10
Springfield, MA--CT	25.45%	11
Riverside--San Bernardino, CA	25.23%	12
Detroit, MI	24.91%	13
Philadelphia, PA--NJ	24.72%	14
Cleveland, OH	24.69%	15
UNITED STATES	24.59%	--
Buffalo--Niagara Falls, NY	24.48%	16
Houston, TX	24.43%	17
Birmingham, AL	24.13%	18
Chicago, IL--Northwestern Indiana	24.12%	19
Cincinnati, OH--KY	23.82%	20
Tampa--St. Petersburg--Clearwater, FL	23.50%	21
Fort Lauderdale--Hollywood--Pompano Beach, FL	23.35%	22
St. Louis, MO--IL	23.10%	23
Hartford--Middletown, CT	22.93%	24
Nashville, TN	22.93%	25
Las Vegas, NV	22.80%	26
Akron, OH	22.24%	27
Richmond, VA	22.00%	28
Jacksonville, FL	21.77%	29
Pittsburgh, PA	21.53%	30
Indianapolis, IN	21.52%	31
Dayton, OH	21.30%	32
Milwaukee, WI	21.23%	33
Rochester, NY	20.81%	34
Norfolk--Virginia Beach--Newport News, VA	20.69%	35
Dallas--Fort Worth, TX	20.64%	36
West Palm Beach--Boca Raton--Delray Beach, FL	20.13%	37
Albany--Schenectady--Troy, NY	19.49%	38
Oklahoma City, OK	19.25%	39
Orlando, FL	19.15%	40
Tucson, AZ	19.08%	41
Honolulu, HI	19.07%	42
Columbus, OH	18.77%	43
Phoenix, AZ	18.16%	44
San Diego, CA	18.13%	45
Atlanta, GA	17.65%	46
San Jose, CA	17.64%	47
Sacramento, CA	17.61%	48
Kansas City, MO--KS	17.06%	49
San Francisco--Oakland, CA	16.95%	50
Boston, MA	16.75%	51
Austin, TX	15.97%	52
Omaha, NE--IA	15.71%	53
Portland--Vancouver, OR--WA	14.82%	54
Denver, CO	14.76%	55
Washington, DC--MD--VA	14.29%	56
Salt Lake City, UT	14.22%	57
Minneapolis--St. Paul, MN	12.12%	58
Seattle, WA	11.93%	59

Table 14
Females, Percent of Total Population

Birmingham, AL	53.48%	1
Richmond, VA	53.16%	2
Pittsburgh, PA	53.12%	3
Louisville, KY-IN	52.90%	4
Memphis, TN-AR-MS	52.82%	5
Buffalo-Niagara Falls, NY	52.81%	6
Cleveland, OH	52.76%	7
New Orleans, LA	52.69%	8
Tampa-St. Petersburg-Clearwater, FL	52.62%	9
St. Louis, MO-IL	52.60%	10
Philadelphia, PA-NJ	52.47%	11
Springfield, MA-CT	52.46%	12
Cincinnati, OH-KY	52.44%	13
Indianapolis, IN	52.38%	14
Albany-Schenectady-Troy, NY	52.37%	15
Akron, OH	52.37%	16
New York, NY-Northeastern New Jersey	52.37%	17
Nashville, TN	52.36%	18
Hartford-Middletown, CT	52.36%	19
West Palm Beach-Boca Raton-Delray Beach, FL	52.32%	20
Rochester, NY	52.30%	21
Providence-Pawtucket, RI-MA	52.30%	22
Boston, MA	52.26%	23
Milwaukee, WI	52.21%	24
Miami-Hialeah, FL	52.19%	25
Kansas City, MO-KS	52.18%	26
Baltimore, MD	52.16%	27
Detroit, MI	52.15%	28
Fort Lauderdale-Hollywood-Pompano Beach, FL	52.14%	29
Dayton, OH	51.97%	30
Columbus, OH	51.80%	31
Oklahoma City, OK	51.63%	32
Chicago, IL-Northwestern Indiana	51.63%	33
Omaha, NE-IA	51.62%	34
San Antonio, TX	51.58%	35
Atlanta, GA	51.56%	36
Washington, DC-MD-VA	51.54%	37
El Paso, TX-NM	51.52%	38
Minneapolis-St. Paul, MN	51.43%	39
Portland-Vancouver, OR-WA	51.40%	40
Tucson, AZ	51.30%	41
UNITED STATES	51.28%	-
Jacksonville, FL	51.20%	42
Sacramento, CA	51.15%	43
Denver, CO	51.04%	44
Phoenix, AZ	50.87%	45
Seattle, WA	50.76%	46
Orlando, FL	50.70%	47
Dallas-Fort Worth, TX	50.69%	48
San Francisco-Oakland, CA	50.68%	49
Salt Lake City, UT	50.46%	50
Houston, TX	50.34%	51
Riverside-San Bernardino, CA	50.29%	52
Austin, TX	50.12%	53
Los Angeles, CA	50.01%	54
Norfolk-Virginia Beach-Newport News, VA	49.84%	55
Las Vegas, NV	49.41%	56
San Diego, CA	49.36%	57
Honolulu, HI	49.34%	58
San Jose, CA	49.30%	59

Table 15
Minorities, Percent of Total Population

Honolulu, HI	70.86%	1
Memphis, TN--AR--MS	45.20%	2
New Orleans, LA	41.52%	3
Los Angeles, CA	38.70%	4
Washington, DC--MD--VA	37.75%	5
Birmingham, AL	36.89%	6
Houston, TX	35.89%	7
San Francisco--Oakland, CA	35.08%	8
Atlanta, GA	33.53%	9
Baltimore, MD	33.02%	10
Norfolk--Virginia Beach--Newport News, VA	32.94%	11
New York, NY--Northeastern New Jersey	32.31%	12
Chicago, IL--Northwestern Indiana	32.13%	13
Richmond, VA	31.57%	14
San Jose, CA	31.37%	15
Riverside--San Bernardino, CA	30.00%	16
Detroit, MI	27.82%	17
Dallas--Fort Worth, TX	27.70%	18
Miami--Hialeah, FL	27.19%	19
Austin, TX	26.66%	20
San Antonio, TX	26.43%	21
Philadelphia, PA--NJ	25.81%	22
San Diego, CA	25.81%	23
Jacksonville, FL	25.43%	24
Sacramento, CA	24.28%	25
UNITED STATES	24.24%	--
Cleveland, OH	23.55%	26
El Paso, TX--NM	23.34%	27
Nashville, TN	22.87%	28
Hartford--Middletown, CT	22.68%	29
St. Louis, MO--IL	22.49%	30
Tucson, AZ	21.61%	31
Indianapolis, IN	20.16%	32
Milwaukee, WI	20.12%	33
Oklahoma City, OK	20.04%	34
Las Vegas, NV	19.42%	35
Columbus, OH	18.80%	36
Fort Lauderdale--Hollywood--Pompano Beach, FL	18.51%	37
Dayton, OH	18.48%	38
Orlando, FL	18.45%	39
Kansas City, MO--KS	18.08%	40
Rochester, NY	17.82%	41
Cincinnati, OH--KY	16.79%	42
Louisville, KY--IN	16.76%	43
Denver, CO	15.08%	44
Buffalo--Niagara Falls, NY	15.07%	45
Phoenix, AZ	14.64%	46
Seattle, WA	14.40%	47
Springfield, MA--CT	13.97%	48
Boston, MA	13.15%	49
Akron, OH	13.14%	50
West Palm Beach--Boca Raton--Delray Beach, FL	13.09%	51
Tampa--St. Petersburg--Clearwater, FL	12.44%	52
Omaha, NE--IA	12.22%	53
Pittsburgh, PA	11.10%	54
Portland--Vancouver, OR--WA	9.92%	55
Albany--Schenectady--Troy, NY	9.57%	56
Providence--Pawtucket, RI--MA	9.41%	57
Minneapolis--St. Paul, MN	9.06%	58
Salt Lake City, UT	6.58%	59

Table 16
Median Household Income

San Jose, CA	\$48,151	1
Washington, DC--MD--VA	\$46,718	2
San Francisco--Oakland, CA	\$40,428	3
Honolulu, HI	\$39,826	4
Boston, MA	\$39,691	5
Hartford--Middletown, CT	\$38,145	6
New York, NY--Northeastern New Jersey	\$37,262	7
Los Angeles, CA	\$37,029	8
Minneapolis--St. Paul, MN	\$36,519	9
Seattle, WA	\$36,058	10
Atlanta, GA	\$36,034	11
Chicago, IL--Northwestern Indiana	\$35,224	12
Riverside--San Bernardino, CA	\$34,644	13
Baltimore, MD	\$34,612	14
San Diego, CA	\$34,611	15
Philadelphia, PA--NJ	\$34,400	16
Rochester, NY	\$34,223	17
Detroit, MI	\$33,824	18
Richmond, VA	\$33,250	19
Dallas--Fort Worth, TX	\$32,713	20
West Palm Beach--Boca Raton--Delray Beach, FL	\$32,474	21
Sacramento, CA	\$32,306	22
Springfield, MA--CT	\$32,255	23
Albany--Schenectady--Troy, NY	\$32,185	24
Denver, CO	\$32,182	25
St. Louis, MO--IL	\$31,960	26
Kansas City, MO--KS	\$31,639	27
Houston, TX	\$31,528	28
Orlando, FL	\$31,468	29
Providence--Pawtucket, RI--MA	\$31,427	30
Milwaukee, WI	\$31,048	31
Indianapolis, IN	\$30,687	32
Phoenix, AZ	\$30,661	33
Dayton, OH	\$30,657	34
Las Vegas, NV	\$30,620	35
Norfolk--Virginia Beach--Newport News, VA	\$30,619	36
Salt Lake City, UT	\$30,592	37
Cincinnati, OH--KY	\$30,591	38
Portland--Vancouver, OR--WA	\$30,499	39
Fort Lauderdale--Hollywood--Pompano Beach, FL	\$30,381	40
Columbus, OH	\$30,373	41
Cleveland, OH	\$30,107	42
UNITED STATES	\$30,056	-
Omaha, NE--IA	\$29,869	43
Nashville, TN	\$29,848	44
Jacksonville, FL	\$29,655	45
Austin, TX	\$27,371	46
Oklahoma City, OK	\$27,261	47
Pittsburgh, PA	\$27,253	48
Akron, OH	\$27,252	49
Birmingham, AL	\$26,858	50
Miami--Hialeah, FL	\$26,826	51
Louisville, KY--IN	\$26,778	52
Buffalo--Niagara Falls, NY	\$26,762	53
Memphis, TN--AR--MS	\$26,717	54
Tampa--St. Petersburg--Clearwater, FL	\$26,290	55
San Antonio, TX	\$25,698	56
Tucson, AZ	\$25,102	57
New Orleans, LA	\$23,590	58
El Paso, TX--NM	\$22,676	59

Table 17
Household Size, Persons Per Household

El Paso, TX--NM	3.30	1
Riverside--San Bernardino, CA	3.11	2
Salt Lake City, UT	3.04	3
Honolulu, HI	3.03	4
Los Angeles, CA	2.96	5
San Antonio, TX	2.89	6
San Jose, CA	2.86	7
Norfolk--Virginia Beach--Newport News, VA	2.83	8
San Diego, CA	2.79	9
Miami--Hialeah, FL	2.79	10
Houston, TX	2.76	11
Chicago, IL--Northwestern Indiana	2.75	12
New York, NY--Northeastern New Jersey	2.72	13
Philadelphia, PA--NJ	2.71	14
Memphis, TN--AR--MS	2.70	15
New Orleans, LA	2.69	16
Springfield, MA--CT	2.69	17
Detroit, MI	2.67	18
Baltimore, MD	2.67	19
Dallas--Fort Worth, TX	2.64	20
Orlando, FL	2.64	21
Washington, DC--MD--VA	2.64	22
Omaha, NE--IA	2.64	23
Sacramento, CA	2.63	24
UNITED STATES	2.63	--
Jacksonville, FL	2.63	25
Providence--Pawtucket, RI--MA	2.62	26
Atlanta, GA	2.62	27
Milwaukee, WI	2.62	28
Boston, MA	2.62	29
Phoenix, AZ	2.60	30
St. Louis, MO--IL	2.60	31
Cincinnati, OH--KY	2.60	32
San Francisco--Oakland, CA	2.59	33
Hartford--Middletown, CT	2.58	34
Rochester, NY	2.58	35
Akron, OH	2.58	36
Minneapolis--St. Paul, MN	2.58	37
Birmingham, AL	2.58	38
Las Vegas, NV	2.57	39
Oklahoma City, OK	2.56	40
Dayton, OH	2.55	41
Kansas City, MO--KS	2.54	42
Cleveland, OH	2.54	43
Columbus, OH	2.54	44
Tucson, AZ	2.53	45
Indianapolis, IN	2.53	46
Louisville, KY--IN	2.52	47
Albany--Schenectady--Troy, NY	2.52	48
Buffalo--Niagara Falls, NY	2.52	49
Richmond, VA	2.51	50
Nashville, TN	2.51	51
Portland--Vancouver, OR--WA	2.49	52
Pittsburgh, PA	2.48	53
Denver, CO	2.48	54
Austin, TX	2.47	55
Seattle, WA	2.46	56
Fort Lauderdale--Hollywood--Pompano Beach, FL	2.37	57
Tampa--St. Petersburg--Clearwater, FL	2.34	58
West Palm Beach--Boca Raton--Delray Beach, FL	2.31	59

Table 18
Below Poverty Level, Percent of Total Population

El Paso, TX--NM	26.54%	1
New Orleans, LA	22.28%	2
San Antonio, TX	20.14%	3
Memphis, TN--AR--MS	18.73%	4
Miami--Hialeah, FL	18.01%	5
Tucson, AZ	17.32%	6
Austin, TX	15.81%	7
Birmingham, AL	15.70%	8
Houston, TX	15.31%	9
Detroit, MI	13.91%	10
Akron, OH	13.78%	11
Louisville, KY--IN	13.67%	12
Los Angeles, CA	13.63%	13
Oklahoma City, OK	13.59%	14
Buffalo--Niagara Falls, NY	13.18%	15
UNITED STATES	13.12%	—
Columbus, OH	13.09%	16
Milwaukee, WI	13.05%	17
Dayton, OH	12.60%	18
Riverside--San Bernardino, CA	12.60%	19
New York, NY--Northeastern New Jersey	12.42%	20
Sacramento, CA	12.39%	21
Cleveland, OH	12.31%	22
Chicago, IL--Northwestern Indiana	12.30%	23
Phoenix, AZ	12.06%	24
Springfield, MA--CT	12.03%	25
Jacksonville, FL	12.01%	26
Dallas--Fort Worth, TX	11.92%	27
Cincinnati, OH--KY	11.88%	28
Nashville, TN	11.83%	29
Pittsburgh, PA	11.79%	30
Norfolk--Virginia Beach--Newport News, VA	11.68%	31
San Diego, CA	11.49%	32
Baltimore, MD	11.42%	33
Philadelphia, PA--NJ	11.33%	34
St. Louis, MO--IL	11.26%	35
Rochester, NY	11.11%	36
Tampa--St. Petersburg--Clearwater, FL	11.10%	37
Indianapolis, IN	10.91%	38
Las Vegas, NV	10.62%	39
Atlanta, GA	10.56%	40
Fort Lauderdale--Hollywood--Pompano Beach, FL	10.29%	41
Portland--Vancouver, OR--WA	10.24%	42
Richmond, VA	10.17%	43
Kansas City, MO--KS	10.13%	44
Omaha, NE--IA	10.05%	45
Denver, CO	10.05%	46
Providence--Pawtucket, RI--MA	10.00%	47
Orlando, FL	9.94%	48
Hartford--Middletown, CT	9.85%	49
Albany--Schenectady--Troy, NY	9.75%	50
Salt Lake City, UT	9.48%	51
San Francisco--Oakland, CA	9.17%	52
Boston, MA	8.65%	53
Minneapolis--St. Paul, MN	8.49%	54
West Palm Beach--Boca Raton--Delray Beach, FL	8.42%	55
Seattle, WA	7.84%	56
San Jose, CA	7.37%	57
Honolulu, HI	7.28%	58
Washington, DC--MD--VA	6.80%	59

Table 19
Work Disability, Percent of Civilians Age 15+

UNITED STATES	12.06%	—
Tampa—St. Petersburg—Clearwater, FL	11.51%	1
Pittsburgh, PA	10.42%	2
Louisville, KY—IN	10.19%	3
Detroit, MI	10.08%	4
Akron, OH	10.07%	5
New Orleans, LA	9.94%	6
Providence—Pawtucket, RI—MA	9.91%	7
Cleveland, OH	9.88%	8
Tucson, AZ	9.83%	9
Birmingham, AL	9.81%	10
West Palm Beach—Boca Raton—Delray Beach, FL	9.79%	11
Dayton, OH	9.79%	12
Fort Lauderdale—Hollywood—Pompano Beach, FL	9.70%	13
Portland—Vancouver, OR—WA	9.59%	14
Buffalo—Niagara Falls, NY	9.56%	15
Sacramento, CA	9.30%	16
Oklahoma City, OK	9.29%	17
Philadelphia, PA—NJ	9.13%	18
Baltimore, MD	9.11%	19
Cincinnati, OH—KY	9.07%	20
Jacksonville, FL	9.03%	21
Springfield, MA—CT	8.95%	22
Memphis, TN—AR—MS	8.94%	23
Las Vegas, NV	8.87%	24
St. Louis, MO—IL	8.54%	25
Albany—Schenectady—Troy, NY	8.53%	26
Columbus, OH	8.53%	27
Nashville, TN	8.44%	28
San Antonio, TX	8.43%	29
Phoenix, AZ	8.40%	30
Indianapolis, IN	8.32%	31
Milwaukee, WI	8.30%	32
San Francisco—Oakland, CA	8.12%	33
Rochester, NY	8.06%	34
Miami—Hialeah, FL	8.04%	35
Boston, MA	8.00%	36
Seattle, WA	7.98%	37
Richmond, VA	7.95%	38
New York, NY—Northeastern New Jersey	7.88%	39
Orlando, FL	7.84%	40
Kansas City, MO—KS	7.80%	41
Hartford—Middletown, CT	7.79%	42
Denver, CO	7.77%	43
San Diego, CA	7.75%	44
Riverside—San Bernardino, CA	7.72%	45
Omaha, NE—IA	7.59%	46
Norfolk—Virginia Beach—Newport News, VA	7.56%	47
Chicago, IL—Northwestern Indiana	7.54%	48
El Paso, TX—NM	7.46%	49
Minneapolis—St. Paul, MN	7.10%	50
Atlanta, GA	7.03%	51
Los Angeles, CA	6.98%	52
Salt Lake City, UT	6.84%	53
Dallas—Fort Worth, TX	6.70%	54
Honolulu, HI	6.27%	55
Houston, TX	6.25%	56
San Jose, CA	6.23%	57
Washington, DC—MD—VA	6.21%	58
Austin, TX	5.98%	59

Table 20
Carpool/Vanpool to Work, Percent of Workers Age 16+

Honolulu, HI	20.35%	1
Riverside--San Bernardino, CA	17.46%	2
El Paso, TX--NM	16.96%	3
Miami--Hialeah, FL	15.56%	4
Washington, DC--MD--VA	15.37%	5
Las Vegas, NV	15.34%	6
Los Angeles, CA	15.05%	7
New Orleans, LA	14.80%	8
Tucson, AZ	14.80%	9
San Antonio, TX	14.74%	10
Baltimore, MD	14.54%	11
Houston, TX	14.38%	12
Phoenix, AZ	14.21%	13
Norfolk--Virginia Beach--Newport News, VA	13.93%	14
Jacksonville, FL	13.93%	15
Sacramento, CA	13.87%	16
San Diego, CA	13.81%	17
Salt Lake City, UT	13.57%	18
Dallas--Fort Worth, TX	13.56%	19
Memphis, TN--AR--MS	13.44%	20
UNITED STATES	13.36%	-
Austin, TX	13.07%	21
Pittsburgh, PA	12.90%	22
San Francisco--Oakland, CA	12.88%	23
Nashville, TN	12.88%	24
Tampa--St. Petersburg--Clearwater, FL	12.87%	25
Fort Lauderdale--Hollywood--Pompano Beach, FL	12.83%	26
Indianapolis, IN	12.77%	27
Orlando, FL	12.76%	28
Richmond, VA	12.66%	29
Birmingham, AL	12.65%	30
Oklahoma City, OK	12.57%	31
Denver, CO	12.50%	32
Albany--Schenectady--Troy, NY	12.49%	33
West Palm Beach--Boca Raton--Delray Beach, FL	12.45%	34
Louisville, KY--IN	12.32%	35
Providence--Pawtucket, RI--MA	12.29%	36
San Jose, CA	12.22%	37
Portland--Vancouver, OR--WA	12.05%	38
Kansas City, MO--KS	12.02%	39
Chicago, IL--Northwestern Indiana	12.01%	40
Philadelphia, PA--NJ	12.01%	41
Hartford--Middletown, CT	11.98%	42
Omaha, NE--IA	11.92%	43
Atlanta, GA	11.82%	44
Springfield, MA--CT	11.66%	45
Seattle, WA	11.45%	46
Buffalo--Niagara Falls, NY	11.42%	47
Cincinnati, OH--KY	11.37%	48
St. Louis, MO--IL	11.37%	49
Columbus, OH	11.22%	50
Milwaukee, WI	11.02%	51
Rochester, NY	10.85%	52
Minneapolis--St. Paul, MN	10.62%	53
Cleveland, OH	10.43%	54
New York, NY--Northeastern New Jersey	10.22%	55
Detroit, MI	10.00%	56
Dayton, OH	9.91%	57
Boston, MA	9.86%	58
Akron, OH	9.76%	59

Table 21
Use Transit for Work Trip, Percent of Workers Age 16+

New York, NY--Northeastern New Jersey	29.48%	1
Chicago, IL--Northwestern Indiana	15.81%	2
Washington, DC--MD--VA	15.55%	3
Boston, MA	14.69%	4
San Francisco--Oakland, CA	14.03%	5
Philadelphia, PA--NJ	13.26%	6
Honolulu, HI	10.33%	7
Pittsburgh, PA	10.09%	8
Baltimore, MD	9.43%	9
New Orleans, LA	8.51%	10
Seattle, WA	8.09%	11
Cleveland, OH	6.71%	12
Portland--Vancouver, OR--WA	6.52%	13
Albany--Schenectady--Troy, NY	6.43%	14
Milwaukee, WI	6.17%	15
Minneapolis--St. Paul, MN	6.11%	16
Hartford--Middletown, CT	6.06%	17
Miami--Hialeah, FL	5.93%	18
Atlanta, GA	5.92%	19
Buffalo--Niagara Falls, NY	5.67%	20
Los Angeles, CA	5.50%	21
UNITED STATES	5.27%	--
Cincinnati, OH--KY	4.93%	22
Rochester, NY	4.80%	23
Richmond, VA	4.76%	24
Denver, CO	4.58%	25
Houston, TX	4.49%	26
Austin, TX	4.35%	27
San Antonio, TX	4.19%	28
Louisville, KY--IN	3.92%	29
Columbus, OH	3.66%	30
St. Louis, MO--IL	3.56%	31
San Diego, CA	3.44%	32
Tucson, AZ	3.40%	33
Salt Lake City, UT	3.39%	34
Memphis, TN--AR--MS	3.34%	35
Providence--Pawtucket, RI--MA	3.10%	36
San Jose, CA	3.04%	37
El Paso, TX--NM	2.88%	38
Dayton, OH	2.83%	39
Detroit, MI	2.81%	40
Dallas--Fort Worth, TX	2.78%	41
Sacramento, CA	2.76%	42
Indianapolis, IN	2.75%	43
Nashville, TN	2.58%	44
Kansas City, MO--KS	2.49%	45
Springfield, MA--CT	2.49%	46
Jacksonville, FL	2.47%	47
Omaha, NE--IA	2.30%	48
Norfolk--Virginia Beach--Newport News, VA	2.25%	49
Phoenix, AZ	2.20%	50
Fort Lauderdale--Hollywood--Pompano Beach, FL	2.08%	51
Las Vegas, NV	2.04%	52
Akron, OH	1.90%	53
Birmingham, AL	1.67%	54
Tampa--St. Petersburg--Clearwater, FL	1.64%	55
Orlando, FL	1.54%	56
West Palm Beach--Boca Raton--Delray Beach, FL	0.98%	57
Riverside--San Bernardino, CA	0.94%	58
Oklahoma City, OK	0.79%	59

Table 22
Work at Home, Percent of Workers Age 16+

Norfolk--Virginia Beach--Newport News, VA	5.44%	1
San Diego, CA	4.83%	2
San Francisco--Oakland, CA	3.65%	3
Honolulu, HI	3.37%	4
Portland--Vancouver, OR--WA	3.31%	5
Denver, CO	3.29%	6
Seattle, WA	3.27%	7
Salt Lake City, UT	3.20%	8
Tucson, AZ	3.07%	9
Minneapolis--St. Paul, MN	3.01%	10
UNITED STATES	2.96%	-
Phoenix, AZ	2.84%	11
Austin, TX	2.75%	12
Sacramento, CA	2.75%	13
Washington, DC--MD--VA	2.74%	14
Los Angeles, CA	2.69%	15
Jacksonville, FL	2.68%	16
West Palm Beach--Boca Raton--Delray Beach, FL	2.63%	17
Omaha, NE--IA	2.55%	18
Kansas City, MO--KS	2.52%	19
Boston, MA	2.45%	20
San Jose, CA	2.43%	21
Nashville, TN	2.34%	22
Riverside--San Bernardino, CA	2.30%	23
Oklahoma City, OK	2.27%	24
Atlanta, GA	2.25%	25
New York, NY--Northeastern New Jersey	2.25%	26
Tampa--St. Petersburg--Clearwater, FL	2.20%	27
Dallas--Fort Worth, TX	2.19%	28
St. Louis, MO--IL	2.12%	29
El Paso, TX--NM	2.12%	30
Philadelphia, PA--NJ	2.10%	31
Richmond, VA	2.09%	32
San Antonio, TX	2.07%	33
Indianapolis, IN	2.06%	34
Columbus, OH	2.06%	35
Cincinnati, OH--KY	2.06%	36
Rochester, NY	2.03%	37
Milwaukee, WI	2.01%	38
Miami--Hialeah, FL	2.00%	39
Houston, TX	1.99%	40
Chicago, IL--Northwestern Indiana	1.98%	41
Baltimore, MD	1.93%	42
Orlando, FL	1.92%	43
Akron, OH	1.91%	44
Pittsburgh, PA	1.89%	45
Springfield, MA--CT	1.89%	46
Fort Lauderdale--Hollywood--Pompano Beach, FL	1.87%	47
Albany--Schenectady--Troy, NY	1.85%	48
Dayton, OH	1.84%	49
Cleveland, OH	1.81%	50
Hartford--Middletown, CT	1.73%	51
New Orleans, LA	1.66%	52
Louisville, KY--IN	1.64%	53
Buffalo--Niagara Falls, NY	1.58%	54
Providence--Pawtucket, RI--MA	1.56%	55
Detroit, MI	1.49%	56
Birmingham, AL	1.46%	57
Las Vegas, NV	1.42%	58
Memphis, TN--AR--MS	1.40%	59

Table 23
Average Travel Time to Work (minutes)

New York, NY--Northeastern New Jersey	31.28	1
Washington, DC--MD--VA	29.03	2
Chicago, IL--Northwestern Indiana	28.54	3
Riverside--San Bernardino, CA	28.40	4
San Francisco--Oakland, CA	26.49	5
Los Angeles, CA	26.20	6
Houston, TX	25.85	7
Atlanta, GA	25.59	8
Baltimore, MD	25.43	9
Philadelphia, PA--NJ	24.92	10
Miami--Hialeah, FL	24.77	11
Boston, MA	24.08	12
Seattle, WA	23.91	13
Honolulu, HI	23.52	14
Dallas--Fort Worth, TX	23.50	15
New Orleans, LA	23.44	16
San Jose, CA	23.20	17
Detroit, MI	23.12	18
Phoenix, AZ	22.94	19
Fort Lauderdale--Hollywood--Pompano Beach, FL	22.86	20
Orlando, FL	22.66	21
Pittsburgh, PA	22.62	22
St. Louis, MO--IL	22.48	23
UNITED STATES	22.40	-
Cleveland, OH	22.35	24
Denver, CO	22.18	25
Jacksonville, FL	21.97	26
San Diego, CA	21.92	27
Sacramento, CA	21.62	28
Cincinnati, OH--KY	21.59	29
San Antonio, TX	21.51	30
Tampa--St. Petersburg--Clearwater, FL	21.40	31
Norfolk--Virginia Beach--Newport News, VA	21.37	32
Birmingham, AL	21.21	33
Memphis, TN--AR--MS	21.18	34
Indianapolis, IN	21.01	35
Nashville, TN	20.93	36
Portland--Vancouver, OR--WA	20.90	37
Richmond, VA	20.88	38
Kansas City, MO--KS	20.69	39
Tucson, AZ	20.62	40
West Palm Beach--Boca Raton--Delray Beach, FL	20.60	41
Minneapolis--St. Paul, MN	20.44	42
Louisville, KY--IN	20.41	43
Columbus, OH	20.30	44
Las Vegas, NV	20.27	45
Salt Lake City, UT	20.05	46
El Paso, TX--NM	20.01	47
Austin, TX	19.85	48
Milwaukee, WI	19.72	49
Akron, OH	19.71	50
Oklahoma City, OK	19.41	51
Hartford--Middletown, CT	19.40	52
Dayton, OH	19.22	53
Providence--Pawtucket, RI--MA	19.12	54
Buffalo--Niagara Falls, NY	18.90	55
Albany--Schenectady--Troy, NY	18.79	56
Springfield, MA--CT	18.64	57
Rochester, NY	18.11	58
Omaha, NE--IA	17.61	59

Table 24
Drive Alone to Work, Percent of Workers Age 16+

Detroit, MI	83.17%	1
Dayton, OH	82.38%	2
Akron, OH	82.36%	3
Birmingham, AL	82.17%	4
Oklahoma City, OK	81.14%	5
Kansas City, MO-KS	80.33%	6
West Palm Beach-Boca Raton-Delray Beach, FL	80.31%	7
St. Louis, MO-IL	80.14%	8
Omaha, NE-IA	79.83%	9
Fort Lauderdale-Hollywood-Pompano Beach, FL	79.64%	10
Indianapolis, IN	79.46%	11
Louisville, KY-IN	79.32%	12
Tampa-St. Petersburg-Clearwater, FL	79.07%	13
Nashville, TN	78.98%	14
Memphis, TN-AR-MS	78.96%	15
Columbus, OH	78.77%	16
Dallas-Fort Worth, TX	78.65%	17
Springfield, MA-CT	78.48%	18
Orlando, FL	78.37%	19
Providence-Pawtucket, RI-MA	78.13%	20
Cincinnati, OH-KY	78.07%	21
San Jose, CA	77.85%	22
Atlanta, GA	77.58%	23
Cleveland, OH	77.46%	24
Rochester, NY	77.30%	25
Richmond, VA	76.95%	26
Salt Lake City, UT	76.09%	27
Sacramento, CA	76.08%	28
Jacksonville, FL	76.06%	29
Minneapolis-St. Paul, MN	76.06%	30
Milwaukee, WI	75.76%	31
Buffalo-Niagara Falls, NY	75.73%	32
Houston, TX	75.65%	33
Denver, CO	75.44%	34
Phoenix, AZ	75.31%	35
Hartford-Middletown, CT	75.29%	36
Austin, TX	75.26%	37
Riverside-San Bernardino, CA	74.99%	38
Las Vegas, NV	74.91%	39
San Antonio, TX	74.07%	40
Portland-Vancouver, OR-WA	73.25%	41
UNITED STATES	73.19%	-
El Paso, TX-NM	72.75%	42
Norfolk-Virginia Beach-Newport News, VA	72.71%	43
Miami-Hialeah, FL	72.39%	44
Albany-Schenectady-Troy, NY	72.28%	45
Seattle, WA	72.23%	46
Tucson, AZ	71.85%	47
Los Angeles, CA	71.84%	48
San Diego, CA	71.37%	49
New Orleans, LA	69.97%	50
Baltimore, MD	69.23%	51
Pittsburgh, PA	68.95%	52
Philadelphia, PA-NJ	65.97%	53
Boston, MA	65.10%	54
Chicago, IL-Northwestern Indiana	64.97%	55
San Francisco-Oakland, CA	62.75%	56
Washington, DC-MD-VA	61.39%	57
Honolulu, HI	57.11%	58
New York, NY-Northeastern New Jersey	50.45%	59

Table 25
Work Departure Time 6-8 a.m., Percent of Workers Age 16+

Birmingham, AL	59.01%	1
Houston, TX	55.55%	2
Indianapolis, IN	54.97%	3
Kansas City, MO-KS	54.91%	4
San Antonio, TX	54.88%	5
Nashville, TN	54.64%	6
Omaha, NE-IA	54.38%	7
Denver, CO	54.37%	8
Dallas-Fort Worth, TX	54.23%	9
Jacksonville, FL	54.00%	10
El Paso, TX-NM	53.92%	11
Memphis, TN-AR-MS	53.53%	12
Hartford-Middletown, CT	53.50%	13
Sacramento, CA	52.91%	14
Minneapolis-St. Paul, MN	52.82%	15
Richmond, VA	52.72%	16
Dayton, OH	52.65%	17
St. Louis, MO-IL	52.46%	18
Oklahoma City, OK	52.08%	19
Atlanta, GA	51.74%	20
Austin, TX	51.52%	21
Columbus, OH	51.43%	22
Portland-Vancouver, OR-WA	51.35%	23
Honolulu, HI	51.29%	24
Orlando, FL	51.23%	25
Milwaukee, WI	51.17%	26
Tampa-St. Petersburg-Clearwater, FL	51.16%	27
New Orleans, LA	51.03%	28
Cincinnati, OH-KY	50.80%	29
Providence-Pawtucket, RI-MA	50.70%	30
UNITED STATES	50.55%	-
Rochester, NY	50.48%	31
Baltimore, MD	50.35%	32
Salt Lake City, UT	50.13%	33
San Diego, CA	49.82%	34
Chicago, IL-Northwestern Indiana	49.62%	35
Seattle, WA	49.59%	36
Pittsburgh, PA	49.57%	37
Phoenix, AZ	49.48%	38
Tucson, AZ	49.47%	39
Cleveland, OH	49.39%	40
Washington, DC-MD-VA	49.35%	41
Norfolk-Virginia Beach-Newport News, VA	49.13%	42
Akron, OH	48.97%	43
Philadelphia, PA-NJ	48.87%	44
San Jose, CA	48.50%	45
Springfield, MA-CT	48.08%	46
Louisville, KY-IN	48.06%	47
Miami-Hialeah, FL	47.93%	48
Fort Lauderdale-Hollywood-Pompano Beach, FL	47.90%	49
West Palm Beach-Boca Raton-DeRay Beach, FL	47.89%	50
Los Angeles, CA	47.89%	51
Albany-Schenectady-Troy, NY	47.44%	52
Detroit, MI	46.56%	53
San Francisco-Oakland, CA	46.55%	54
Riverside-San Bernardino, CA	46.50%	55
Boston, MA	46.33%	56
Buffalo-Niagara Falls, NY	45.65%	57
New York, NY-Northeastern New Jersey	45.15%	58
Las Vegas, NV	41.62%	59

Table 26
Work Departure Time 6-9 a.m., Percent of Workers Age 16+

Richmond, VA	73.18%	1
Hartford--Middletown, CT	73.06%	2
Birmingham, AL	72.20%	3
Albany--Schenectady--Troy, NY	71.42%	4
Atlanta, GA	71.39%	5
Washington, DC--MD--VA	71.20%	6
Dallas--Fort Worth, TX	71.13%	7
West Palm Beach--Boca Raton--Delray Beach, FL	70.98%	8
Boston, MA	70.89%	9
Philadelphia, PA--NJ	70.80%	10
Houston, TX	70.59%	11
New York, NY--Northeastern New Jersey	70.48%	12
Kansas City, MO--KS	70.35%	13
Providence--Pawtucket, RI--MA	70.34%	14
Fort Lauderdale--Hollywood--Pompano Beach, FL	70.28%	15
Jacksonville, FL	69.83%	16
Indianapolis, IN	69.76%	17
Rochester, NY	69.52%	18
Tampa--St. Petersburg--Clearwater, FL	69.37%	19
Nashville, TN	69.25%	20
Miami--Hialeah, FL	69.19%	21
Austin, TX	69.18%	22
Orlando, FL	69.17%	23
Baltimore, MD	69.14%	24
New Orleans, LA	68.82%	25
Memphis, TN--AR--MS	68.74%	26
Oklahoma City, OK	68.69%	27
Denver, CO	68.69%	28
San Antonio, TX	68.68%	29
Columbus, OH	68.54%	30
St. Louis, MO--IL	68.38%	31
Sacramento, CA	68.09%	32
Cincinnati, OH--KY	68.06%	33
Minneapolis--St. Paul, MN	67.99%	34
Cleveland, OH	67.88%	35
San Jose, CA	67.81%	36
Pittsburgh, PA	67.80%	37
Dayton, OH	67.75%	38
Omaha, NE--IA	67.52%	39
Portland--Vancouver, OR--WA	67.04%	40
UNITED STATES	66.95%	--
Chicago, IL--Northwestern Indiana	66.68%	41
Salt Lake City, UT	66.61%	42
El Paso, TX--NM	66.53%	43
San Francisco--Oakland, CA	66.41%	44
Buffalo--Niagara Falls, NY	66.26%	45
Springfield, MA--CT	66.22%	46
Louisville, KY--IN	65.43%	47
Milwaukee, WI	64.99%	48
Seattle, WA	64.76%	49
Akron, OH	64.73%	50
Los Angeles, CA	64.62%	51
Detroit, MI	64.55%	52
San Diego, CA	64.50%	53
Tucson, AZ	64.30%	54
Norfolk--Virginia Beach--Newport News, VA	63.39%	55
Phoenix, AZ	62.86%	56
Honolulu, HI	61.71%	57
Riverside--San Bernardino, CA	58.06%	58
Las Vegas, NV	54.85%	59

Table 27
Work Outside Home County or State, Percent of Workers Age 16+

Washington, DC--MD--VA	49.98%	1
Denver, CO	48.06%	2
Richmond, VA	47.85%	3
Atlanta, GA	47.48%	4
Baltimore, MD	44.41%	5
Norfolk--Virginia Beach--Newport News, VA	42.89%	6
New York, NY--Northeastern New Jersey	42.71%	7
St. Louis, MO--IL	38.67%	8
Boston, MA	36.31%	9
Philadelphia, PA--NJ	35.54%	10
Kansas City, MO--KS	34.87%	11
San Francisco--Oakland, CA	33.86%	12
Providence--Pawtucket, RI--MA	33.45%	13
Albany--Schenectady--Troy, NY	33.06%	14
Riverside--San Bernardino, CA	32.94%	15
Minneapolis--St. Paul, MN	32.88%	16
Portland--Vancouver, OR--WA	32.01%	17
New Orleans, LA	31.71%	18
Detroit, MI	29.41%	19
Cincinnati, OH--KY	28.11%	20
UNITED STATES	23.88%	-
Orlando, FL	23.28%	21
Milwaukee, WI	22.54%	22
Akron, OH	21.51%	23
Oklahoma City, OK	20.26%	24
Fort Lauderdale--Hollywood--Pompano Beach, FL	19.53%	25
Dayton, OH	19.39%	26
Omaha, NE--IA	18.93%	27
Dallas--Fort Worth, TX	18.52%	28
Chicago, IL--Northwestern Indiana	17.42%	29
Springfield, MA--CT	17.16%	30
Indianapolis, IN	16.22%	31
Hartford--Middletown, CT	15.99%	32
Sacramento, CA	15.58%	33
Nashville, TN	15.43%	34
Cleveland, OH	15.25%	35
Louisville, KY--IN	13.96%	36
Pittsburgh, PA	13.64%	37
Seattle, WA	13.48%	38
Birmingham, AL	12.37%	39
Jacksonville, FL	11.93%	40
Tampa--St. Petersburg--Clearwater, FL	11.74%	41
Salt Lake City, UT	11.11%	42
San Jose, CA	10.92%	43
Los Angeles, CA	10.30%	44
West Palm Beach--Boca Raton--Delray Beach, FL	10.10%	45
Austin, TX	10.06%	46
Houston, TX	9.46%	47
Buffalo--Niagara Falls, NY	7.91%	48
Memphis, TN--AR--MS	7.64%	49
Columbus, OH	6.37%	50
Miami--Hialeah, FL	4.89%	51
El Paso, TX--NM	4.48%	52
San Antonio, TX	3.57%	53
San Diego, CA	3.30%	54
Rochester, NY	3.03%	55
Tucson, AZ	2.71%	56
Las Vegas, NV	2.36%	57
Phoenix, AZ	2.24%	58
Honolulu, HI	0.96%	59

Table 28
0-Vehicle Households, Percent of Total Households

New York, NY--Northeastern New Jersey	33.27%	1
Philadelphia, PA--NJ	20.24%	2
New Orleans, LA	20.08%	3
Baltimore, MD	19.07%	4
Buffalo--Niagara Falls, NY	18.57%	5
Chicago, IL--Northwestern Indiana	18.54%	6
Pittsburgh, PA	18.37%	7
Boston, MA	17.57%	8
Miami--Hialeah, FL	16.11%	9
Milwaukee, WI	15.47%	10
Albany--Schenectady--Troy, NY	15.08%	11
Cleveland, OH	14.98%	12
Hartford--Middletown, CT	14.71%	13
Memphis, TN--AR--MS	14.17%	14
Springfield, MA--CT	14.08%	15
Rochester, NY	13.94%	16
Cincinnati, OH--KY	13.90%	17
Detroit, MI	13.81%	18
San Francisco--Oakland, CA	13.60%	19
Louisville, KY--IN	13.10%	20
Washington, DC--MD--VA	12.99%	21
Honolulu, HI	12.73%	22
Richmond, VA	12.20%	23
St. Louis, MO--IL	11.98%	24
Providence--Pawtucket, RI--MA	11.83%	25
Birmingham, AL	11.73%	26
UNITED STATES	11.53%	-
El Paso, TX--NM	10.97%	27
San Antonio, TX	10.69%	28
Fort Lauderdale--Hollywood--Pompano Beach, FL	10.41%	29
Akron, OH	10.35%	30
Dayton, OH	10.34%	31
Columbus, OH	10.23%	32
Indianapolis, IN	10.20%	33
Jacksonville, FL	10.18%	34
Norfolk--Virginia Beach--Newport News, VA	10.16%	35
Minneapolis--St. Paul, MN	9.94%	36
Portland--Vancouver, OR--WA	9.92%	37
Atlanta, GA	9.79%	38
Tampa--St. Petersburg--Clearwater, FL	9.77%	39
Los Angeles, CA	9.71%	40
Nashville, TN	9.57%	41
Omaha, NE--IA	9.50%	42
Tucson, AZ	9.48%	43
Kansas City, MO--KS	9.19%	44
Houston, TX	8.68%	45
Seattle, WA	8.59%	46
Las Vegas, NV	8.57%	47
Sacramento, CA	8.49%	48
Denver, CO	8.44%	49
San Diego, CA	8.18%	50
Austin, TX	7.85%	51
West Palm Beach--Boca Raton--Delray Beach, FL	7.80%	52
Riverside--San Bernardino, CA	7.37%	53
Phoenix, AZ	7.22%	54
Orlando, FL	6.93%	55
Oklahoma City, OK	6.87%	56
Dallas--Fort Worth, TX	6.77%	57
Salt Lake City, UT	6.43%	58
San Jose, CA	5.31%	59

Table 29
Number of Private Vehicles per Household

San Jose, CA	1.98	1
Salt Lake City, UT	1.87	2
Riverside--San Bernardino, CA	1.86	3
Seattle, WA	1.79	4
San Diego, CA	1.75	5
Los Angeles, CA	1.74	6
Atlanta, GA	1.74	7
Denver, CO	1.74	8
Sacramento, CA	1.73	9
Dallas--Fort Worth, TX	1.71	10
Oklahoma City, OK	1.71	11
Orlando, FL	1.70	12
Minneapolis--St. Paul, MN	1.69	13
Omaha, NE--IA	1.69	14
Portland--Vancouver, OR--WA	1.68	15
Akron, OH	1.68	16
Kansas City, MO--KS	1.67	17
Birmingham, AL	1.67	18
Dayton, OH	1.67	19
UNITED STATES	1.67	-
Norfolk--Virginia Beach--Newport News, VA	1.67	20
Nashville, TN	1.66	21
El Paso, TX--NM	1.65	22
Phoenix, AZ	1.65	23
San Francisco--Oakland, CA	1.63	24
Richmond, VA	1.63	25
Las Vegas, NV	1.63	26
Columbus, OH	1.62	27
Providence--Pawtucket, RI--MA	1.62	28
Houston, TX	1.62	29
Indianapolis, IN	1.61	30
Jacksonville, FL	1.61	31
Washington, DC--MD--VA	1.61	32
Detroit, MI	1.61	33
St. Louis, MO--IL	1.61	34
Cincinnati, OH--KY	1.60	35
Honolulu, HI	1.60	36
San Antonio, TX	1.59	37
Tucson, AZ	1.58	38
Louisville, KY--IN	1.58	39
Austin, TX	1.58	40
Hartford--Middletown, CT	1.55	41
Rochester, NY	1.54	42
West Palm Beach--Boca Raton--Delray Beach, FL	1.53	43
Cleveland, OH	1.53	44
Memphis, TN--AR--MS	1.53	45
Springfield, MA--CT	1.53	46
Milwaukee, WI	1.51	47
Tampa--St. Petersburg--Clearwater, FL	1.50	48
Fort Lauderdale--Hollywood--Pompano Beach, FL	1.49	49
Miami--Hialeah, FL	1.49	50
Albany--Schenectady--Troy, NY	1.47	51
Baltimore, MD	1.45	52
Boston, MA	1.44	53
Chicago, IL--Northwestern Indiana	1.42	54
Philadelphia, PA--NJ	1.38	55
Buffalo--Niagara Falls, NY	1.38	56
Pittsburgh, PA	1.38	57
New Orleans, LA	1.34	58
New York, NY--Northeastern New Jersey	1.16	59

Table 30
Number of Workers per Household

Honolulu, HI	1.61	1
San Jose, CA	1.53	2
Washington, DC--MD--VA	1.50	3
Los Angeles, CA	1.42	4
Norfolk--Virginia Beach--Newport News, VA	1.42	5
Atlanta, GA	1.39	6
Orlando, FL	1.39	7
Minneapolis--St. Paul, MN	1.39	8
San Diego, CA	1.38	9
Salt Lake City, UT	1.38	10
Boston, MA	1.36	11
Dallas--Fort Worth, TX	1.36	12
Omaha, NE--IA	1.34	13
Houston, TX	1.33	14
San Francisco--Oakland, CA	1.32	15
Riverside--San Bernardino, CA	1.32	16
Baltimore, MD	1.31	17
Seattle, WA	1.31	18
Jacksonville, FL	1.31	19
Austin, TX	1.31	20
Richmond, VA	1.30	21
Chicago, IL--Northwestern Indiana	1.30	22
Las Vegas, NV	1.30	23
Hartford--Middletown, CT	1.29	24
Denver, CO	1.29	25
Nashville, TN	1.29	26
Columbus, OH	1.28	27
Miami--Hialeah, FL	1.28	28
New York, NY--Northeastern New Jersey	1.28	29
El Paso, TX--NM	1.27	30
Kansas City, MO--KS	1.27	31
Indianapolis, IN	1.27	32
San Antonio, TX	1.26	33
Philadelphia, PA--NJ	1.26	34
Springfield, MA--CT	1.26	35
Providence--Pawtucket, RI--MA	1.25	36
UNITED STATES	1.25	-
Rochester, NY	1.24	37
Milwaukee, WI	1.24	38
Portland--Vancouver, OR--WA	1.24	39
Albany--Schenectady--Troy, NY	1.24	40
Phoenix, AZ	1.23	41
Oklahoma City, OK	1.23	42
St. Louis, MO--IL	1.23	43
Memphis, TN--AR--MS	1.23	44
Cincinnati, OH--KY	1.22	45
Sacramento, CA	1.22	46
Dayton, OH	1.19	47
Louisville, KY--IN	1.18	48
Detroit, MI	1.17	49
Birmingham, AL	1.15	50
Akron, OH	1.15	51
Tucson, AZ	1.14	52
Cleveland, OH	1.14	53
New Orleans, LA	1.12	54
Buffalo--Niagara Falls, NY	1.12	55
Fort Lauderdale--Hollywood--Pompano Beach, FL	1.11	56
Pittsburgh, PA	1.09	57
Tampa--St. Petersburg--Clearwater, FL	1.07	58
West Palm Beach--Boca Raton--Delray Beach, FL	1.02	59

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NOTICE

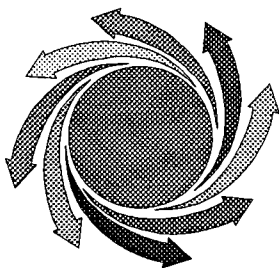
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